Vol. 4 APRIL, 1922 No. 1

THE PAPER INDUSTRY

The Monthly Educational Journal of the Paper Industry.

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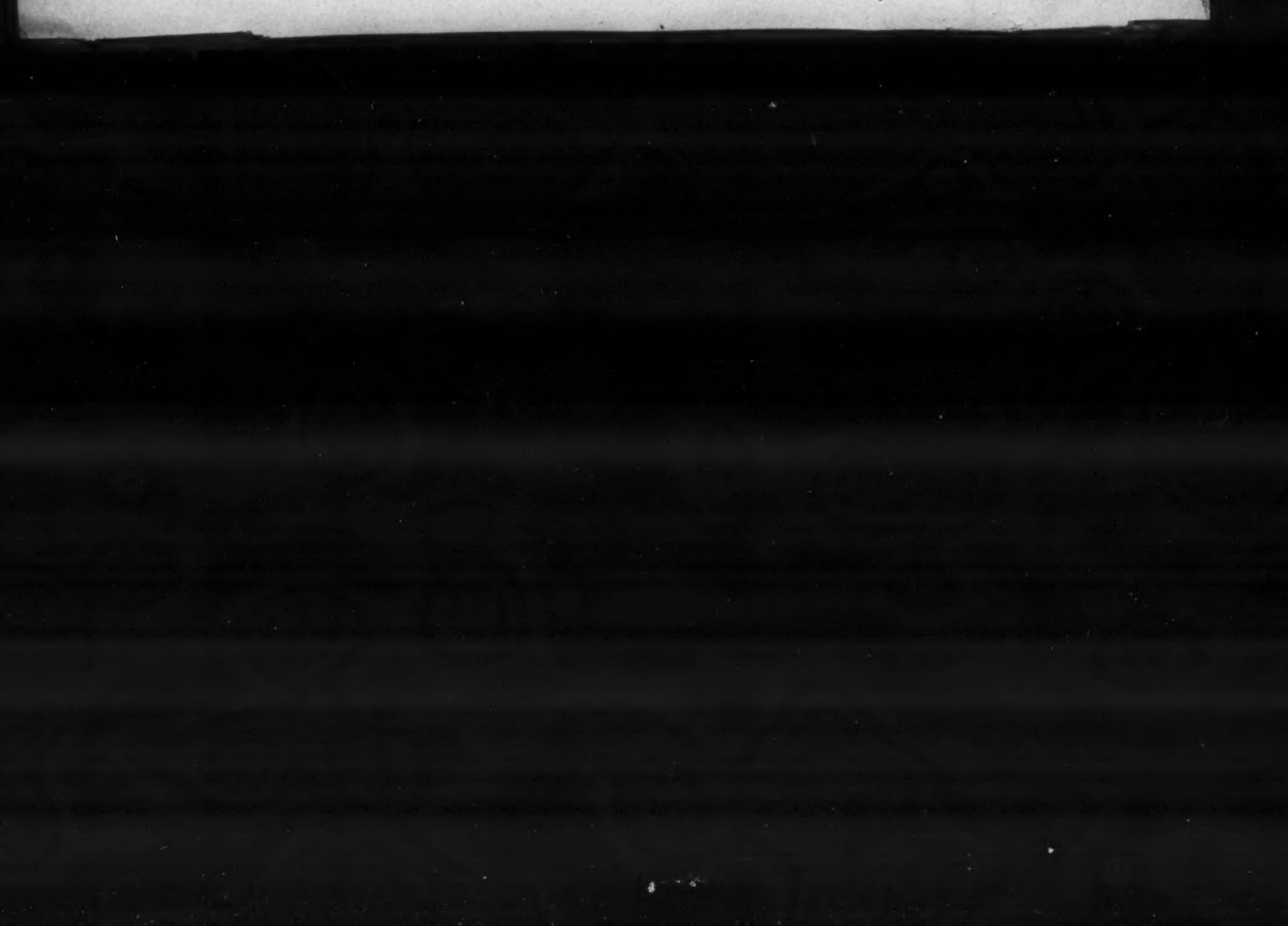

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Pumps—Stuff, Suction and Centrifugal
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Vol. 4—No. 1

THE PAPER INDUSTRY

A. SCOTT DOWD
Editor

A MONTHLY EDUCATIONAL JOURNAL
Devoted to the Interests of the Pulp and Paper Industry

CONTENTS

FOR APRIL, 1922

Editorials ..... 11, 19, 27 and 35
Eliminating the Waste in Paper Industry Which Is Due to Poor Lighting. *H. T. Spaulding, R. A. Palmer* 61
The Wear of Machine Wires ..... *Major R. Marx and Prof. E. Mallett* 65
Accident Hazards in the Wood Room ..... *D. B. Davies* 69
Power Plant Management ..... *Robert June, M. E.* 72
The Salesman as an Evangel for Good Business ..... *Lawrence H. Sloan* 76
Hydrating Machinery for the Paper Mill ..... *George L. Bidwell* 78
The Small Mill's Finishing Room and Its Auxiliaries ..... *H. M. Grasselt* 80
Analysis of Reclaimed Cooking Acid for Sulphite Mills ..... *Gosta P. Genberg* 83
Six Definite Things That Workers Want ..... *James H. Collins* 85
The Power Plant of the Paper Industry ..... *A. G. Darling and H. W. Rogers* 87
Sulphur and Sulphur Burners ..... *H. E. Weston* 90
Relative Efficiency of the Automatic Magazine Grinder as Compared with the Pocket Type Grinder .... *John J. Case* 94
Pointers for the Engineer ..... *W. F. Schaphorst, M. E.* 98
Producing Bleach Liquor with Liquid Chlorine in the Pulp or Paper Mill. *S. W. Jacobs and H. P. Wells* 100
Forty-Fifth Annual Convention of the American Paper and Pulp Association 117
Commercial Outlook 181
Domestic Markets 183
Current Quotations 189
Import and Export Markets 191
Buyers' Guide 199-203
Index to Advertisers 205

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Paper Is a Purchase Now!

SIXTY days ago we said the time had come to buy paper.
Thirty days ago we reiterated the same advice with emphasis.
Today, again, we say, **"All lines of paper are a purchase now."**

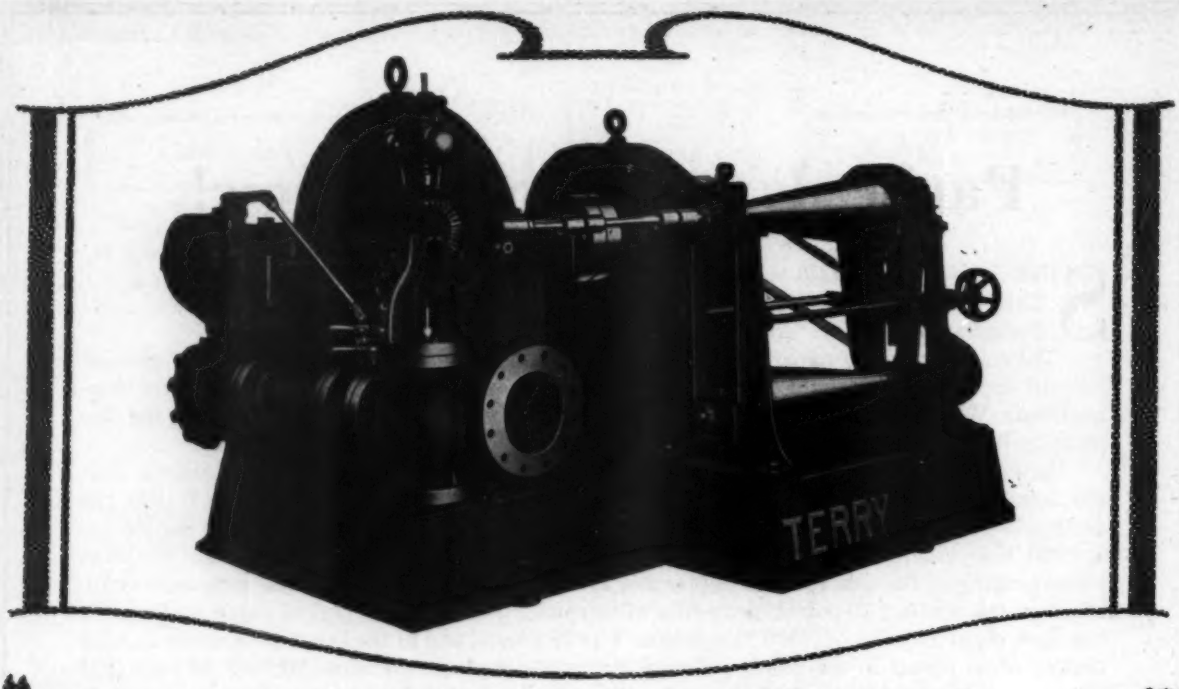
The consumption of paper is intimately related to the volume of manufacture of general lines of commodities. The volume of manufacture depends largely upon the demand for commodities. When the demand is heavy the volume of manufacture increases; when the demand is light the volume of manufacture decreases.

In January, 1920, the volume of manufacture, according to the Harvard Economic Survey, reached almost 120—or 20 points above normal; this was the peak. By June 15, 1920, the decline in the volume of manufacture had set in definitely; in eight months or by September 1, 1920, the volume of manufacture had declined to normal, or 20 points below what it was at the beginning of the year. From September 1, 1920, to January 1, 1921, the volume of manufacture fell another 20 points, or to 80% of normal. This was a period of rapid decline. In the first eight months of 1920 the decline was 20 points, and in the last four months another decline of 20 points in the volume of manufacture took place; therefore, during the year 1920 the volume of manufacture of all commodities declined 40 points—a terrific contraction in so short a time, probably unprecedented in the history of manufacturing. Then followed a period of six and a half months when a still further decline in the volume of manufacture took place. On or about the 15th of July, 1921, the low point—71% of normal—was reached. Then a sharp upturn followed and by October 10, 1921, the volume of manufacture had advanced to 82% of normal. Thereafter the rise continued by slow degrees, until today the volume of manufacture is almost, if not exactly, 90% of normal, thus showing since July 15, 1921, a steady appreciation, or 19-point gain from the low point.

The main thing that we want to stress is this: that we believe the volume of manufacture will reach 100% of normal by the first of July, 1922. What is causing the volume of manufacture to increase? Demand for commodities! Just as the lack of demand started the decline in the volume of manufacture in January, 1920, which continued until it reached its low point eighteen months later—so now the increased demand for commodities is causing the volume of manufacture to enlarge, and we believe it is well within the range of reasonable probability that normality of volume of manufacture will be certainly reached by July first here.

What about prices? Just this: Prices, like wages, declined more rapidly than did the volume of manufacture, so that although the decline in volume didn't touch bottom until on or about July 15, 1921, yet wages and prices in most lines of manufacture and industry had touched the bottom prior to that date. Then, although the volume of manufacture began to increase, prices and wages remained static. Or, as in a great many lines of paper production, for instance, the prices further declined between July 15, 1921, and March 1, 1922. Why was that? Because some lines were slow to accomplish their deflation, and then, too, some paper mills have been accepting business along lines manifestly unendurable. They must advance their prices or reduce their costs, and as costs today are practically static, an advance in price to keep pace with the advance in volume of demand and manufacture seems inevitable.

We of THE PAPER INDUSTRY believe that such advances are overdue and will shortly be matters of record. The above is merely one of the many sound reasons why we say that **"Paper is a Purchase now."**



"Variation in Speeds *from* 6 to 1"

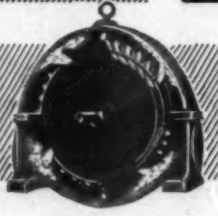
THE steam turbine has been recognized as an ideal drive for paper machines which turn out only one grade and weight of paper because of its uniform and constant rotary speed (with variations of less than 1%), its dependability with attendant freedom from upkeep cost and repairs and, most important of all, because of its clean exhaust. The drying rolls are, therefore, kept free from oil and operating at their utmost efficiency.

The advent of the new Terry unit, with its variable speed governor, now makes the turbine applicable to paper machines producing various grades and weights of stock. A constant speed of 300 R. P. M. or 1800 R. P. M., or any intervening speed, may be held with but slight variation.

Write for Bulletin 25-I on the Terry turbine and gears and special reference on the variable speed drive.

T-754

THE TERRY TURBINE



Offices in Principal Cities in U.S.A. also in Important Industrial Foreign Countries

The Terry Steam Turbine Co.
Terry Sq. Hartford, Conn. U.S.A.

Business Straws

THERE are many signs showing that the business wind is beginning to blow in the right direction. These signs come from many sources, but the two instances indicated here show that the same conditions prevail in New York and Illinois alike, and we are sure the same is true for most all parts of the country.

Improved business conditions are suggested by a study of the monthly tabulations made by the New York Evening Post of the volume of advertising carried in seventeen daily and nine Sunday newspapers of the City. Comparing the total volume of newspaper advertising in New York the first two months of 1922 with the total for January and February, 1921, we find a gain of 6% in lineage. The most notable feature is that while local advertising shows a small gain in 1922 over the large volume carried during the same period of 1921, foreign advertising shows an increase of 24%, which is some indication of the extent to which the manufacturers of nationally advertised commodities are vigorously fighting to bring the volume of their sales back to normal after the period of depression. Foreign advertising amounted to 18% of the total volume of New York City newspaper advertising during the first two months of 1922 and to 15% of the total volume during the first two months of 1921. During January and February, 1922, foreign advertising was 20% of the total volume of advertising carried in the morning papers, 17% of the total in the evening papers, and 18% of the total in Sunday papers.

A progressive improvement is indicated by comparisons of the separate months. The total volume of advertising of all kinds in all the issues of the New York City newspapers in January, 1922, was 3.5% more than in January, 1921, while in February, 1922, the increase was 8.5% over the volume in February last year. Heavy increases are noted in automobile advertising, while the volume of space devoted to dry goods, furniture and real estate has been especially well sustained.

In the total number of pages printed, including both advertising and reading matter, the morning papers show an increase of 18%, the evening papers 11%, and the Sunday papers 19%, making an average increase of 16% in pages for the first two months of 1922 over the first two months of 1921. All of this means the consumption of a larger volume of newsprint.

There is good news for owners, managers and workers in industry in the announcement made recently at the joint convention of the Illinois gas, electric light and railway associations that the public utility companies of the state of Illinois will spend $75,000,000 this year in plant extensions and new equipment. This means work for men in the construction of the improvements themselves, and more jobs for more workers in the shops and factories that will produce the material and equipment required, as well as more men to handle the new and larger plants.

While the amount involved is considerable, the real importance of the announcement lies rather in the fact that the outlay is authorized by men who have the best possible facilities for observing the trend of business conditions and who, as a rule, do not engage in campaigns of expansion that are not fully warranted by business prospects. The authorizing of the expenditure of $75,000,000 in one branch of industry in one state alone is, indeed, a concrete expression of faith in the business future, an expression of the kind of confidence that is needed to quicken the long-hoped-for business revival.

Alton Box Board Co., Alton, Ill.

Fort Wayne Corrugated Paper Co.
Vincennes, Ind.

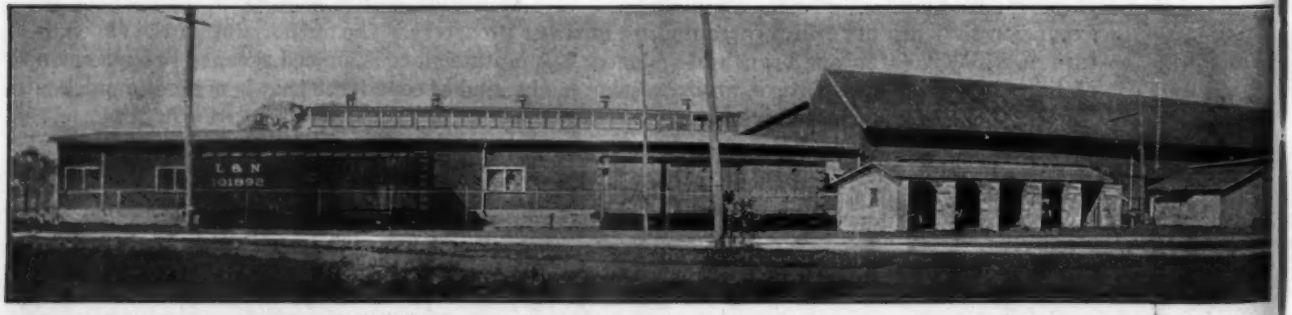
Green Chain Grate ing Money for

EACH plant burns the screenings from the cheapest Bituminous coals available. They save money in buying coal. Green stokers make this saving possible. Green stokers burn cheap screenings with just as high efficiencies as they obtain with higher priced fuels. Efficiencies depend upon control of losses. Green stokers make it possible to control the losses of the combustion process.

Each plant is saving labor over the former method of operation. One man can tend six to eight thousand boiler horse power when fired with Green Chain Grate Stokers. Green stokers are completely automatic. They feed the fuel, ignite and burn it, and continuously and automatically discharge the ash. Emergency gangs or extra men

Results obtained in practical experience of more than twenty-five years guide Green Engineers. They will gladly show you what

GREEN ENGINEERING COMPANY



Business Sense

By IKE KENNEDY

Experience

MUCH has been said and written on this subject; it is inexhaustible and the lessons spoken never seem to reach home.

Its tables of profit and loss, it would seem, are not for us.

Its a good thing sometimes to forget and good sometimes to remember, but let it cast no gloom over your present endeavors lest you have your experience for naught.

"Once bite twice shy" has saved us lots of trouble and has cost us lots of failures.

The child burned with fire is forever cautious; the losing investor forever after, a "Doubting Thomas."

Business is suffering from an overdose of confidence without experience, or the forgetfulness of experience without confidence.

We are forgetting right now, because experience has taught us it is better to forget.

A yesterday's experience, it would seem, is never a complete formula for today's guidance.

The experience of yesterday's weather is no forecast for tomorrow's.

The failures of yesterday do not mark time for the new hopes of the present.

All we know for sure is that which is taken from the experience table of life as it is, as it has been, as it ever shall be.

A new life, a new being, a different body is said to be handed each of us every seven years.

If we now happen to be at the close of this cycle of transformation, it will be a good time right now to shed our old business skins, our old methods, our petty grievances, and our hopeless visions narrowed by our past unfortunate experiences and let the sunshine of a new springtime find our energies unwithered from the grueling tests of personal fortitude.

If we would be guided by the past then let's go back, if we can retrace this labyrinth of our devious ways, to the simple experiences of yesterday.

If there we are to find but empty nests along the wayside, then let's carry them forward as a memory of our most cherished experience to be mixed with the years when the abandon of youth has taken its flight, when the maddening march of progress is overriding the finer sentiments of us all.

Don't forsake the memories, the experiences of the past, nor yet dwell too long in their tender embrace.

It was a good old experience, it was worth it—God grant it has not soured us!

Averages

HAVE you ever paid much, if any, attention to the seasons, to note their average temperatures, their average rainfall, their average sunshine, their average yield, their average disasters and the nicely balanced average of everything? Have you ever noted the average balance of the pleasures and sorrows, of sickness and health, of fortune and misfortune, of freedom and serfdom, of accomplishment and disappointment?

Just go back through life a little way and see if it hasn't been just about an even break. Be fair in your reckoning; strike a just balance; match good with evil, grief with happiness, success with failure, tears with smiles, and see how these things have been so evenly and wisely apportioned.

The rag doll to the urchin is as much to her happiness as the daintiest bisque of the pampered rich. The clay pipe is preferable to the Perfecto to the man whose labors have given him a liver to wrestle with it. The dirty unkept baby of the Ghetto is frequently dearer to the mother of it than the beribboned and perfumed offspring of the more fortunate. The voice of the unknown street singer is often filled with greater emotion than was ever uttered from the golden throat of the Diva.

The grim life of those who go down to the mines frequently has more enchantment in its very solitude than comes to those who "dwell in the midst of alarms."

The loneliness of the farm has nothing about it which can compare to the loneliness of a great city.

The splendor of palaces in their gilded elegance with their life of intrigue, vanities, rivalries, jealousies and social restrictions has many an occupant who would trade it all for a thatched cottage and the freedom of a bare foot boy.

The poorest workman with a good liver and sure of his "three squares" has it all over America's richest financier.

The fellow who can measure his hours of labor by the wage and leave his troubles behind him with his working tools, has it all over the fellow whose business cares and worries sit like a demond at his bed rail and rob him of life's greatest blessing—rest.

And you men who are out of a job, what of it? If you **have** lost it, you will no doubt find another, but if you had lost a business, lost health, lost friends, lost youth, lost nerve, lost perception and perspective, lost everything but life itself, then you are lucky never to have had cares, and your **average** is "nose and nose" in the pursuit of happiness, even if you are standing still.

It's a great old world—the happiest are those who have found their gait, be it fleet or sluggish. If our yield on this earth had the same average throughout, we would be a surfeited drug, failures through our very success, instead of successful through our average failures.

There is no industry of any description that cannot be bettered by a constant interchange of ideas, a conservation of wasted energies and a curtailment of mismanaged or unmanaged details.

The seed which grew a smile
The deed which proved worth while,
Will blossom over and again
To edge the path of kindly men.

The Sign of Efficiency

MORSE DRIVES

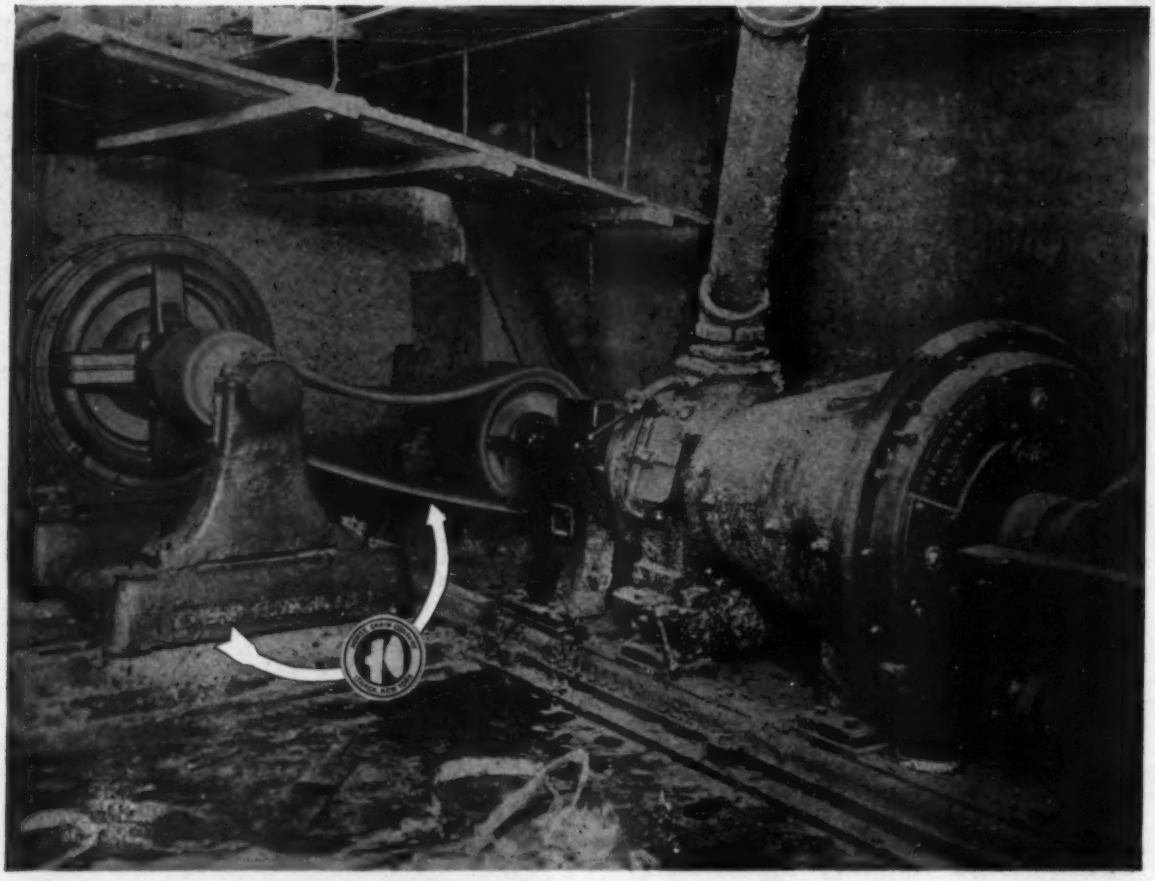
The Sign of Durability

THE MORSE "ROCKER JOINT"

Positive as Gears

Flexible as a Belt

Longer Life



Fifteen Morse Silent Chain Drives in Congoleum Company Mill

The illustration shows one of the fifteen Morse Silent Chain Drives in the mill of the Congoleum Company, Asbestos, Maryland, driving a Jordan engine from a 150 H.P. motor on felt stock, one of the hardest kinds of stock to refine.

This mill uses the following Morse Chain Drives:—one 150 H.P.; four 100 H.P.; nine 90 H.P.; one 75 H.P., all doing splendid work.

Morse Chains are 99% efficient, silent, durable and economical to maintain.

Where you have unusual and hard conditions from wear and exposure, Morse Silent Chains prove their greatest worth.

For driving Jordan engines, beating engines, paper machine line shafts, and for many other places in the paper mill, the ideal drive is the Morse Silent Chain.

MORSE CHAIN CO., LARGEST MANUFACTURERS OF SILENT CHAINS IN THE WORLD **ITHACA, N. Y.**

Write today for booklet

Morse Engineering Service BENEFIT BY MORSE SERVICE AS OTHERS DO *Assistance Without Obligation*

Address Nearest Office

ATLANTA, GA.....Candler Bldg., Earl F. Scott & Co.
BALTIMORE, MD.....1402 Lexington Bldg.
BOSTON, MASS.....141 Milk Street
CHARLOTTE, N. C.....494 Commercial Bank Bldg.
CHICAGO, ILL.....Merchants L. & T. Bldg.
CLEVELAND, OHIO.....Engineers Bldg.
DETROIT, MICH.....1361 Abbott Street
KANSAS CITY, MO.....Finance Bldg., Morse Eng'rg Co.
NEW YORK CITY.....30 Church Street
MINNEAPOLIS, MINN.....So. 3rd St., Strong-Scott Mfg. Co.
MONTREAL.....St. Nicholas Bldg., Jones & Glassco Reg'd
PHILADELPHIA, PA.....Fuller Bldg.
PITTSBURGH, PA.....Westinghouse Bldg.
SAN FRANCISCO, CAL.....Monadnock Bldg.
ST. LOUIS, MO.....Chemical Bldg., Morse Eng'rg Co.
TORONTO....Bank of Hamilton Bldg., Jones & Glassco Reg'd
WINNIPEG, MAN.....Dufferin St., Strong-Scott Mfg. Co.

"Morse" is the Guarantee Always Behind the Efficiency, Durability and Service

It Pays to Be Careful

A STORY that came recently to the office of the National Safety Council, told of a certain industry where the hundred and fifty foremen stood up and took a vow that they would go back to their departments and stop accidents for thirty days. At the end of the thiry days, the record showed a clean slate on serious accidents for all departments, and a reduction of 87 per cent in lost time.

One would ask if this was just luck, but it was not. It was due solely to the fact that these one hundred and fifty foremen came to realize that accidents can be prevented, and ought to be prevented, and they screwed up their will power until they said, "we are going to prevent them." Each went back to his department determined to go the limit to make a record for the month.

It is just such a waking up, a buckling up of belts, and an all-pull-together effort on the part of the foremen that has turned the trick in many paper mills, and marked the beginning of a successful campaign.

A lot of foremen talk about safety as if it were mollycoddle business—they really do not believe in it as they believe in efficiency. Until the day comes when foremen wake up to the realization that the saving of a life of one of their workmen is vastly more important business than an increase in production, and is worthy of the brain and brawn of any red blooded man, they will never get back of accident prevention with the sort of determination that will win the confidence and co-operation of their men, and put it over the top.

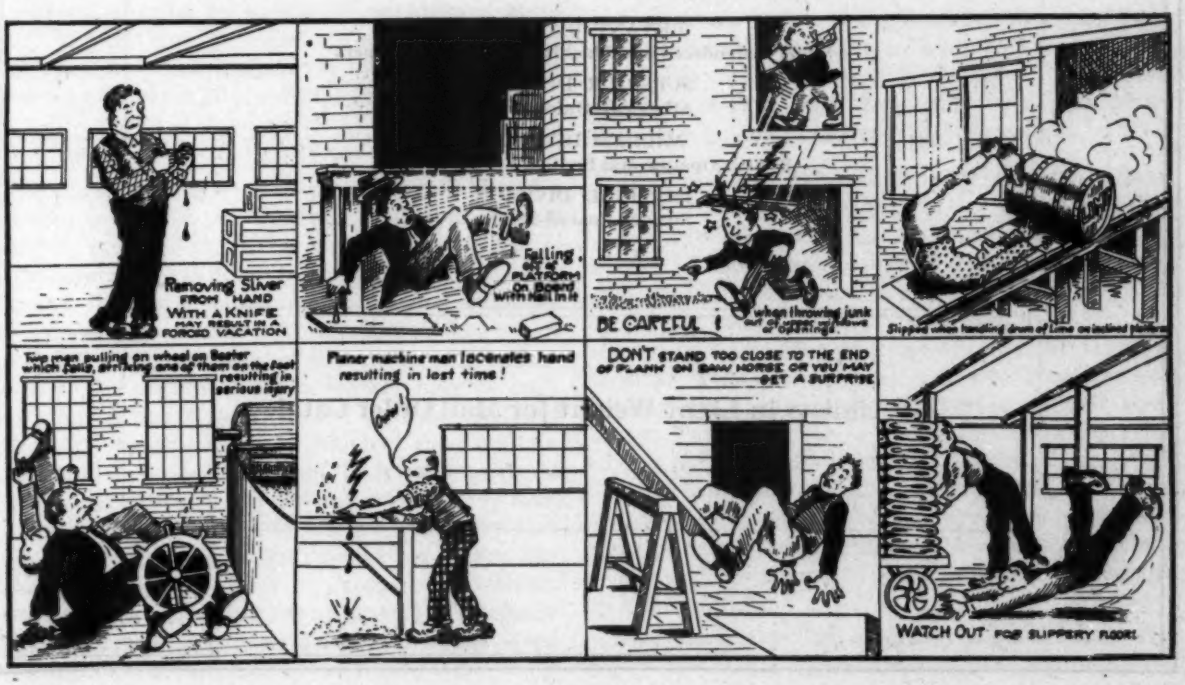
In hundreds of paper mills where managers and foremen have joined hands with their workmen in a common effort to save human life, they have thereby taken the first step toward better relations, and learned how to work together.

An employer who, by money and effort, does everything in his power to protect the lives of his workmen, does more to convince them that he is human and really cares for them than any mere words he can utter.

Safety humanizes the plant. When day by day the foremen and workmen labor together in eliminating dangerous places and practises, and month by month watch with pride the record of decreasing accidents, they unconciously grow into a better understanding and discover that each has virtues the other had not before discovered.

In a recent issue of "The Hammermill Bond," the house organ of the Hammermill Paper Company, Erie, Pennsylvania, the accompanying drawing appeared under the heading "Some of Our Recent Accidents Which Might Easily Have Been Avoided."

The illustration is worth studying as it may cause other men in our industry to be more careful, both for their own good and that of their fellow workmen. It pays to be careful.


Removing Sliver FROM HAND WITH A KNIFE MAY RESULT IN A FORCED VACATION
Falling off of PLATFORM on board with nail in it
when throwing junk out of
BE CAREFUL !
Slipped when handling drum of Lime on inclined platform
Two men pulling on wheel on Beater which broke, striking one of them on the face resulting in serious injury
Planer machine man lacerates hand resulting in lost time !
DON'T STAND TOO CLOSE TO THE END OF PLANK ON SAW HORSE OR YOU MAY GET A SURPRISE
WATCH OUT FOR SLIPPERY FLOORS

BRYANT
PAPER COMPANY
KALAMAZOO, MICHIGAN

DAILY CAPACITY

200 Tons Book Paper **50 Tons Coated Papers**

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IMPERIAL DIVISION
Surface Coated Papers

Specialists in Light Weight for Mail Order Catalogs

Elimination of Waste in Paper Industry Due to Poor Lighting

H. T. SPAULDING and R. A. PALMER
Engineering Department, National Lamp Works of General Electric Co.

DURING the war, the need for industrial products increased at such a rate that manufacturers were forced to increase their floor space, install additional machinery, employ more men, and use every other means available to meet the extraordinary demands made upon them. It was at this time that modern lighting came into its own as an aid to production. Factories running on a 24-hour basis installed modern lighting systems to serve not only at night but during the early morning and late afternoon hours or when the plant was darkened by a cloudy day or passing storm. By providing a higher level of illumination throughout a plant, it was found that the speed of vision of the employees and the general stimulating effect of well-lighted workrooms caused a very considerable increase in production.

Today, however, business conditions are on a different plane. A declining market and consequent decrease in volume of sales and production have forced upon the factory manager problems that are even more vital and perplexing than those attending the increase of output in his plant. The immediate problem is reduction of unit cost. Every means available must be utilized in order to promote economy and minimize waste. General expenses have been curtailed, labor reduced, factory operation costs minimized, in order to satisfy the demands of economy. The cry for the ways and means to increase production has been supplanted by the demand for the ways and means to lower unit cost.

Good Lighting Promotes Efficiency

The efficiency of the eye is greatly impaired under improper or inadequate lighting, and more time is therefore required to do the work when the light is not satisfactory. Where an operation is constantly repeated, the loss of a few seconds on each operation may amount to a considerable number of hours. A high level of illumination permits speed of discrimination of the objects which a worker may be handling, thus saving time. The eye must adjust itself to the various intensities to which it may be subjected, and a uniform level of illumination should therefore be provided throughout the room so that no time will be lost and the worker will experience no discomfort or strain as his eyes adjust themselves in turning from one point to another. Eye-strain and fatigue are responsible for a lowering of efficiency and may lead to permanent defective vision. Good lighting is necessary in order that the workman can do his work accurately and quickly.

The mills of today do not have many machines that are so inefficient as to be responsible for wastes of material, and it is largely through mistakes and inaccuracies of employees that spoilage occurs. Under inadequate lighting, defective material may pass through the process and be a partial or total loss. In places where scales, gages, and other instruments are to be read, inaccuracies may be frequent and costly where the illumination is inadequate.

Where there is need for color discrimination, the MAZDA Daylight lamp with its blue-green bulb giving a light which approximates daylight, is effective in avoiding color distortion that may result in spoilage. In paper laboratories where an accurate discrimination of color is necessary, special equipment is available which gives a light duplicating north sky light. In the distinguishing of delicate tints of approximately white papers and of tinted pulp to match a certain standard, the daylight lamp is very desirable. The rag-sorting room is another place where the daylight lamp may be employed to advantage.

Dirt is also a factor in bringing about spoilage. In a poorly lighted plant, dirt and filth may accumulate without being noticed. The collection of dirt, rust, and color on water pipes, beaters, etc., may be a cause for a deterioration in the quality of paper by the dirt becoming mixed with the pulp. Workrooms can be kept in a neater and cleaner condition where there is a general overhead lighting system.

Working Conditions a Factor in Production Costs

A worker in a dark, gloomy room cannot function efficiently. Poor light tends to make one feel sluggish, and the work at hand becomes drudgery. A bright and pleasant plant is conducive to making the employees alert, keen and content, and the result is speedier work, greater accuracy which means less spoilage, and ultimately a lowering of unit cost. Proper lighting is one of the potent factors in remedying the evils attending insanitation and correcting the conditions that are a menace to safety. Closer and better supervision of the workmen is possible and the employees are more contented and efficient under conditions that are made cheerful and pleasant by good lighting.

Every accident that occurs in a plant raises the

Fig. 1—An inadequate illumination system where all the essentials of good lighting are lacking. Note the glare from improperly shaded lamps, the dark shadows, and the gloomy, depressing appearance of the room.

Fig. 2—The same plant as shown in Fig. 1 with a modern lighting system which replaced the old one. Observe the detail, absence of dense shadows, and bright, cheery appearance of the room result from a uniform high level of illumination.

Fig. 3—The wet end of a machine well lighted by means of units located above and at the sides of the machine. The exposed lamp located on the wall back of the machine for inspection purposes should be avoided, or reduced to brightness.

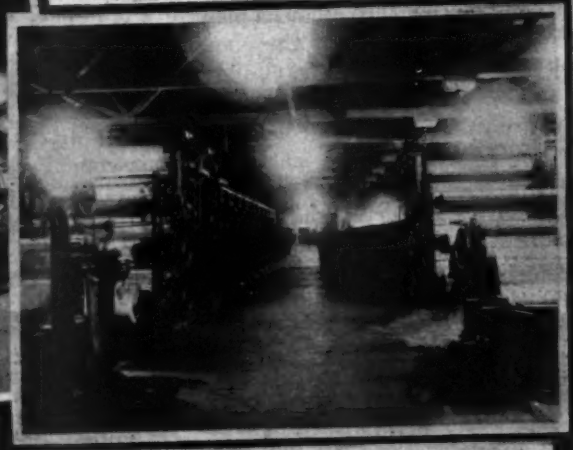


Fig. 4—The insufficiently shielded light sources indicated by the glaring spots in the photograph, produce glare in the eyes of the workmen, and sharp shadows. Eye strain, and a consequent lowering of efficiency, as well as increased possibilities for accident are the results.

Fig. 5—Note the absence of dark shaded areas or corners to accommodate dirt or provide accident hazard in this well-lighted boiler room.

Fig. 6—The Foot-Candle Meter.

unit cost of the product. An injury to an employee means a loss of time and if this injured man does specialized work, the loss is correspondingly great. The loss from paying compensation and wages of workmen who are injured in the plant is altogether too great, whether this loss is paid direct or through the premiums paid insurance companies—an overhead that can be greatly minimized by the expenditure of a small fraction of this amount for a modern lighting system. Dark aisles, dense shadows, and glare are a menace to the health, vision and safety of employees. Dimly lighted passageways provide opportunity for stumbling over a mislaid object which may result in a serious injury. Investigation of accident causes has shown conclusively that inadequate lighting is responsible for 18 per cent of industrial accidents.

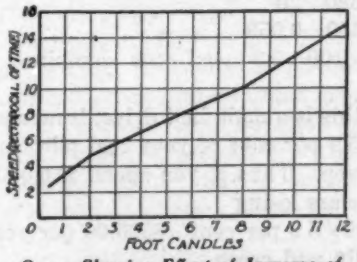
Good Lighting—

Good Lighting requires three things:
1. Light of Suitable Quality.
2. Light of the Proper Direction.
3. Light in the Correct Amount.

- Good Lighting
  - Suitable Quality
    - Absence of Glare.
    - Absence of Reflected Glare.
    - Proper Color
  - Proper Direction
    - Shadows Soft and Luminous.
    - Uniform Distribution.
  - Correct Amount
    - Lighting for Safety.
    - Lighting for Economical Production.
    - Proper Cleaning of Units.

Bad Lighting

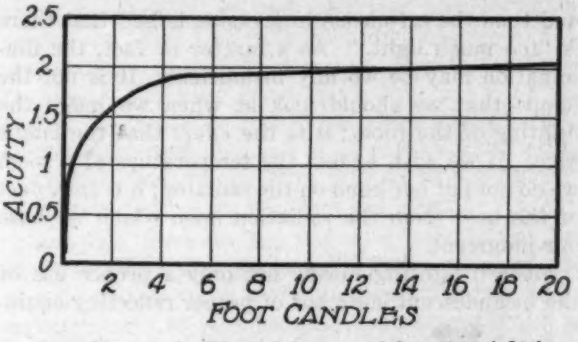
Cause	*Effect*	*Remedy*
Bare Lamps.	Glare, eye strain, wasted light, harsh shadows.	The modern efficient type of reflector such as RLM Standard dome.
Miscellaneous local lights dangling on drop cords.	Glare, eye strain, danger of accident, particularly about belting and moving machinery, short circuits, breakage.	General overhead system.
General System—Units too far apart or too low.	"Spotty" lighting; areas between lamps receive very little light; shadows are very black.	Proper relation between mounting height of units and spacing distance.
Clear lamps where polished surfaces are present on material or machinery.	Reflected glare, eye strain.	Bowl-Enameled MAZDA C lamps, or equipment to diffuse downward light from filament.
Too little illumination.	Time lost by workman, particularly on detail work; eye strain. Accidents; no incentive to keep place cleaned up.	Larger lamps in suitable reflectors spaced closer together if necessary.
Sharp, black shadows.	Accidents; time lost; eye strain.	RLM Standard dome reflectors properly spaced. Bowl-enameled MAZDA C lamps.
Gloomy and cheerless appearance of room.	Unpleasant contrast between light sources and background; dispirited workmen.	Liberal use of white paint accompanied in some cases where location is suitable by use of glass reflectors.
Dusty, dirty, or broken equipment.	Loss of 40% to 60% of the light paid for.	Institute a regular cleaning schedule.



Curve Showing Effect of Increase of Intensity of Light on Speed Discrimination

Essential Requirements

The amount of light necessary depends upon the character of the work. Dark colored materials do not reflect as much light to the eye as those that are light in color, and therefore require higher illumination. From light colored or shiny materials there is sometimes danger from specular reflection which may cause eye fatigue if the worker is exposed to it for a long period of time. The light should be diffused by the use of bowl-enameled lamps or other diffusing equipment to minimize specular reflection. The use of clear lamps should be particularly avoided in the calendering room where there is danger from



Curve Showing the Effect of Increase of Intensity of Light on Acuity of Vision

To Restore a Lighting System

1. Wash reflectors and lamps thoroughly with soap and water at least every third or fourth cleaning period. Apply Cleaning Schedule given below:

Suggested Cleaning Schedules For Direct Lighting Systems

Characteristic of Location	Interval in Days if Units are Wiped out*	Interval in Days if Units are Thoroughly Washed
Very Dirty	3	5
Dirty	7	10
Average	15	20
Clean	30	40

*Washing every third or fourth interval assumed.

2. Fill empty sockets and replace burned-out and blackened lamps with new ones of the correct size and proper voltage rating. The voltage rating of the lamp should be at least no higher than the voltage at the socket when the system is in use. Avail yourself of the service of the lamp manufacturer in determining what the voltage rating of your lamp should be.

3. Refinish ceiling and high side walls in white or in a very light cream color.

4. Make some reliable employee responsible for the maintenance of the lighting system and give him sufficient authority to enable him to get the work done.

reflected glare from the glossy finish of the paper while passing through the rolls.

Bare lamps hanging from drop cords are harmful and represent a waste of light as well. The glare from these lamps is sometimes extremely annoying

This luminaire is designed for use in color matching where the utmost precision is required. A Mazda Daylight lamp is used, which, together with a special color-correcting plate fitted on the reflector, gives a light that duplicates north sky daylight. By this light delicate paper tints can be matched with great accuracy

and thus the erroneous impression is had that there is "too much light." As a matter of fact, the illumination may be wofully insufficient. It is not the lamps that we should look at when we judge the lighting of the room; it is the *effect* that the lamps give. If we wish to test the temperature of a room we do not put our hand on the radiator; it is the *effect* of the heat from the radiation upon which we base our judgment.

Modern lighting means not only a proper use of the incandescent lamp but of proper reflecting equip-

A Type of Color Modifying Unit Using Clear Mazda C Lamp Adapted to The Rag Sorting Room

ment also. Eye strain, fatigue, and dense shadows will result from the use of bare or improperly shaded lamps and much of the light will be absorbed and wasted.

Maintenance

A most important and yet most neglected item in the success of a modern lighting system is proper maintenance. Deterioration of the lighting system is a waste of light. Dirt on the lamps and reflectors and walls darkened by smoke and dust absorb much light from which no benefit is derived, but which, nevertheless, has to be paid for. Blackened and burned out lamps, empty sockets, lamps of improper voltage or wrong size are all responsible for the depreciation which is usually of such magnitude as to be astounding.

The remedy for this loss of light is simple, but in order to be effective must be applied religiously. A definite cleaning schedule should be outlined and responsibility for carrying out the schedule placed with an employee who has sufficient authority to see that it is strictly adhered to.

An instrument that is extremely useful in connection with the maintenance of a lighting system is the foot-candle meter. By means of this instrument the amount of light actually delivered at the work can be measured. Records can be made of the readings taken at regular intervals and when the level of illumination falls below the standard, investigation is made and the proper steps taken to remedy the situation. Standards of illumination for various industries have been drawn up by illuminating engineers and represent the level of illumination that is most desirable for various classes of work. For paper mill lighting, the following standards will be found to promote efficient operation:

Beaters, machining, grinding.....4 foot-candles
Calendering .....6 foot-candles
Finishing, cutting and trimming..8 foot-candles

Good lighting is economy; poor lighting is waste. With a high level of illumination, uniformly distributed throughout the plant, the workman can do his work more quickly and with greater accuracy. A workman cannot produce at his best under conditions that are a menace to his vision, health, and safety. As good lighting established itself as an aid to increased production, so it comes today as an effective factor in production at lower cost.

How to Determine the Cost of Belt Creep and Slip Combined

TO FIGURE the cost of your combined belt slip and creep you must first determine the percentage of slip and creep, which is a simple matter if conditions in the drive are such that the driven pulley can be operated for a while "without load."

When no power is transmitted by a belt, there is no slip or creep, of course. The driven pulley, then, will rotate as many times per minute as it is possible for it to rotate.

When the belt is transmitting full load, however, there is bound to be belt creep and possibly some slip, and the driven pulley will not rotate as rapidly as when "unloaded." The difference in r. p. m., then, divided by the r. p. m. made "unloaded" multiplied by 100, gives the combined percentage of slip and creep.

For example, let us say that a given driven pulley runs 340 r. p. m. in an unloaded state. When the belt carries full load, though, it makes only 320 r. p. m. What is the combined percentage of slip and creep?

Applying the above rule we get

340—320=20

20÷340=0.059

0.059×100=5.9 per cent combined slip and creep.

Now, if this is a main belt drive, it means that you are losing 5.9 per cent of your coal pile through belt slip and creep. Thus if you spend $10,000 per year for coal you are losing

$10,000×5.9 per cent=$590.00 per year due entirely to slip and creep.

Why not apply some good belt treatment and save most of that? Spending a few cents to save several hundred dollars is surely a good investment. Why not take good care of your belts, surely, $590.00 per year is worth while.

The Wear of Machine Wires

By Major R. MARX, M. C., B. Sc. and Professor E. MALLETT, M. Sc., A. M. I. C. E., A. M. I. E. E.

Original Contribution to the Technical Section of the British Paper Makers' Association, and published as such in their current Volume of Proceedings

VERY little has been published in connection with this subject although it is a matter of intimate concern to every papermaker. Such published matter as exists deals in the main with the various causes of accidental damage; but no evidence is available of an attempt to state the normal causes of wear in numerical terms.

It is true that the useful life of a considerable proportion of wires is terminated prematurely owing to accidental or abnormal causes. In this category is included the cumulative effect due to such causes as incorrect alignments, faulty guiding, untrue rolls, etc., as well as damage due to direct action such as might be caused by a split couch jacket or the abuse of acid or heat for cleaning.*

There is clearly no possibility of expressing such "abnormal" causes and their effects in mathematical terms. On the other hand, it should be possible to discover some relation between the life of a wire which is worn out in a normal manner, and the individual causes which contribute to its wear, given the necessary particulars of the wire and of the conditions under which it operates. Such a relationship once established would be of considerable value. The life of the wire would be expressed as a function of each cause or group of causes of wear, and it would be then possible to attack the most influential causes with a clear grasp of the object in view.

It appears doubtful whether at present each of the "normal" causes of wear is clearly understood. They have afforded much scope for speculation and empirical treatment; but only by actual measurement can these causes and their effects be determined with any degree of certainty. Moreover in order to eliminate the effect of abnormal values and coincidence, it is necessary to employ the statistical method of investigation which must cover a large number of observations.

Without causing undue inconvenience in the individual paper mill, it should be possible for such observations and records to be taken over the necessary period of months. Data obtained from a number of selected mills, if properly collated, would be likely to yield results not only of scientific interest but of considerable monetary value to the industry as a whole.

The present paper is put forward merely as a beginning of the investigation into the wear of wires and an indication of a possible method of treating one aspect of the problem. The data on which this paper is based were obtained by J. Reess on a 65-inch machine making common wrapping largely from dirty waste papers and are the results of months of observations. It is true that our deductions from these observations appear to follow a definite law with reasonable accuracy considering the nature of the tests, but it would be absurd to claim without further confirmation that this law is of general application, or that the results are more than an encouragement to proceed further on the lines indicated.

The data used for the following calculations are given in Table A. Heess originally undertook the experiments in order to demonstrate that his patent arrangements of so arranging the suction boxes as to realize an uninterrupted vacuum is an improvement over the usual arrangement. This explains the reason for the two sets of readings in Table A, but any tenable theory of the wear of the wire must of course cover both sets.

The couching angle and pressure were the same in every test. The higher pressures in the suction boxes were measured with calibrated vacuum gauges while for measuring the lower pressures U tubes were employed. The vacuum in each box was measured at approximately the center of the box, i. e., half way across the machine.

The following symbols are employed:

v = speed of wire

h_1, h_2, h_3, etc. = the vacua in the first, second, third, etc., suction boxes (counting from the breast roll).

$h_1 + h_2 + h_3 = h$

m = substance of sheet or weight per unit area.

t = total weight of paper produced on wire during its entire life.

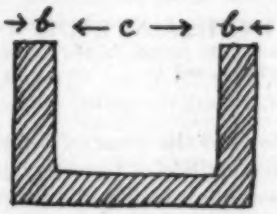
Life of wire therefore equals the time taken to produce t tons of paper. Assuming the width of deckle always to be the same, the life of the wire will therefore be proportional to $\frac{t}{m\,v}$ and calling w the wear of the wire $= \frac{1}{\text{life}}$, which is proportional to $\frac{m\,v}{t}$.

The values for w are tabulated in column 5 of Table B.

Considering first the friction of the wire in its pas-

* The effect of the seam may conveniently be put in a special category. It is of considerable importance especially with fast running machines and comparisons as between different makes of wire would be very interesting.

sage over the suction boxes, which were of the open type:



If b = thickness of the walls of the boxes,
c = the clearance between the inside of the walls, and
l = the suction length of each box;
then for each box the frictional area will be equal to 2·b·l, and the total vertical force on the wire = k·c·l·h, where h_1 is the vacuum maintained in the box, and k is a constant.

A similar reasoning applies in the case of boxes with perforated tops.

Assuming that the value of c is the same for all boxes on the machine, as is generally the case, it follows that the total frictional force on the wire due to contact with all the boxes is:

$$u \cdot k \cdot c \cdot l \cdot h_1 + u \cdot k \cdot c \cdot l \cdot h_2 + u \cdot k \cdot c \cdot l \cdot h_3 + \ldots\ldots\ldots$$
$$= M(h_1 + h_2 + h_3 + \ldots\ldots\ldots)$$
$$= M \cdot h$$

The faster the wire travels over the surfaces of the suction boxes, the greater will be the wear in unit time. Since the rubbing surfaces are well cooled by the continuous flow of water, it is reasonable to assume that no great rise in temperature occurs, in which case u will probably remain constant for various speeds of wire. The wear due to the suction boxes will therefore vary with the speed of the wire; and we may write for that part of the wear (w) which is due to the suction boxes:

$$w_s = M \cdot h \cdot v$$

There will no doubt be frictional wear at various other points besides the suction boxes, e. g., at the apron, breast roll, couch, guide rolls, table rolls, etc. This wear will be, at any rate to some extent, dependent on the tension in the wire which latter will probably be partially dependent on the pull of the suction boxes, so that some of this additional frictional wear will be included in the constant M.

However if the equation $w = M \cdot h \cdot v$ is true, then on plotting $\frac{w}{v}$ against h one should obtain a straight line. The values of h are shown in column 7 of Table B and those of $\frac{w}{v}$ in column 6 of the same

TABLE A

Reference No.	Vacua in Suction Boxes. Inches of Mercury Vacuum. I	II	III	IV	Percentage of dryness before and after Couch Press. Before %	after %	Speed of Machine feet per minute	Substance of sheet in pounds D. C.	Total production per wire Tons
	h_1	h_2	h_3	h_4	d_1	d_2	v	m	
ARRANGEMENT of Suction Boxes with air gaps.									
1	..	2.7	3.0	3.9	10	18.3	145	41.0	211
2	..	2.1	2.7	4.2	11	18.4	110	53.4	208
3	..	1.5	1.5	2.7	11.5	16	190	26.6	210
4	..	1.8	2.7	3.0	11	18	165	32.8	260
5	..	2.1	2.7	4.2	10	18.5	145	41.0	167
6	..	1.8	3.0	3.9	11.5	18.4	...	41.0	....
7	..	1.5	2.7	3.6	10.5	17.6	...	32.8	....
ARRANGEMENT of Suction Boxes with uninterrupted vacuum.									
8	.4	.3	.5	2.4	13.6	19.2	115	53.4	329
9	.3	.2	.5	2.4	16.6	18.9	180	32.8	312
10	.4	.3	.5	3.5	17.9	19	180	32.8	334
11	.2	.2	.3	.8	10.3	17.4	115	53.4	304
12	.3	.3	.5	1.5	14.5	18.9	115	53.4	288
13	.4	.3	.6	3.2	15.3	20.2	115	53.4	300
14	.3	.4	.6	.9	11.8	22.2	90	65.6	375
15	.4	.4	.6	1.0	14.1	24	90	65.6	....

Since the friction is proportional to the vertical force, we have:

friction = u·k·c·l·h, where u is the coefficient of friction.

It will be noted that the value of the friction is independent of the thickness of the walls of the box.*

This friction should be spread over an area of 2·b·l of the wire.

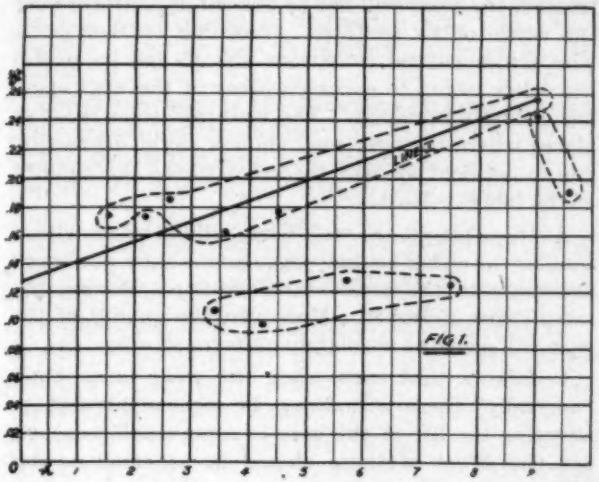
Hence the average frictional force per unit area of wire causing wear will be——

$$\frac{u \cdot k \cdot c \cdot l \cdot h}{2 \cdot b \cdot l} = \frac{u \cdot k \cdot c \cdot h_1}{2 \cdot b}$$

* An interesting corollary to this is that the wear of the wire is not necessarily affected by the number of suction boxes per se, and that providing the total pressure due to the vacuum in all the boxes is not increased, the number of boxes may be added to without detriment to the wire on the score of friction. Comparison between lines 1 to 7 and 8 to 15 in Table A tends to substantiate the statement and it is moreover borne out by other comparative tests of a similar nature carried out on different machines.

table, while the points are plotted in Fig. 1, each with its reference number marked against it.

It is immediately obvious from the scattered positions of the points in Fig. 1 that the above equation is not true and therefore that the friction of the wire as calculated, is insufficient to account entirely for the wear. An endeavor is now made to introduce other variables.



It will be observed that points 2, 8, 11, 12 and 13 (enclosed by a line) refer to like substances of sheets (m = 53.4 lbs. D. C.) and like speeds of wire, (v = 115 ft. min.); that is to say, to like productions per hour (assuming like deckle widths). The line 1 is drawn through these points having the equation $\frac{w}{v} = .128 + .014\,h$ ..... (I)

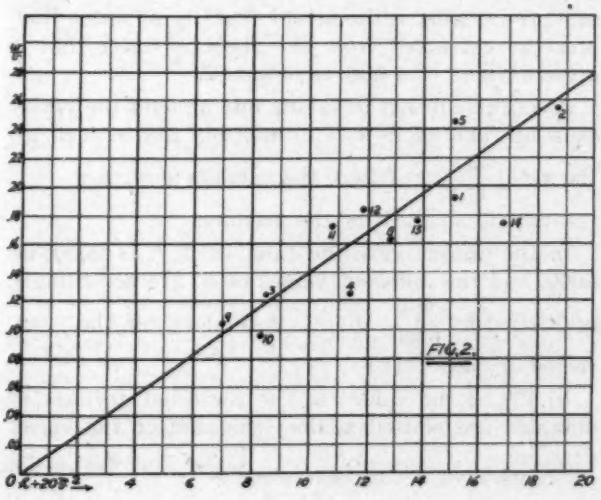
Looking at points 9, 10, 3 and 4, which may be roughly grouped together with average m = 31 and v = 180 and the two points 5 and 1 with m = 41 and v = 145, it would appear likely that the value of $\frac{w}{v}$ increases as m increases, but not in direct proportion to the increase of m. Trials show that roughly $\frac{w}{v}$ increases in proportion to $\frac{m}{v}$.

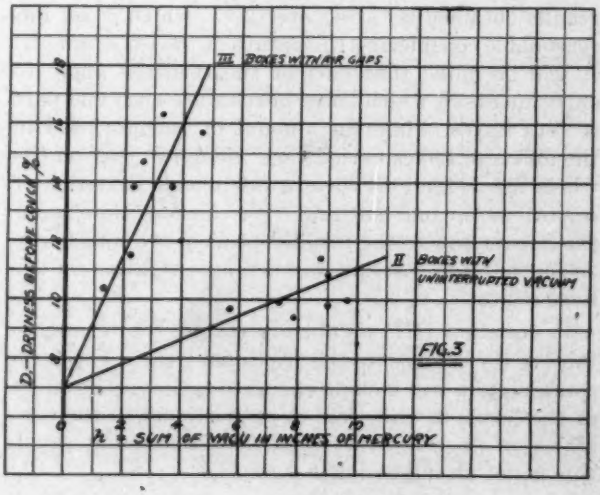
On the assumption that this is so, we have:

$\frac{w}{v} = D \times \frac{m}{v} + .014\,h$, and where m = 53.4, and

TABLE B

1 Reference No.	2 m	3 v	4 t	5 $\frac{w}{t} = \frac{m\,v}{t}$	6 $\frac{w}{v}$	7 h	8 $20\frac{m}{v}$	9 $h + 20\frac{m}{v}$
1	41.0	145	211	28.2	.194	9.6	5.6	15.2
2	53.4	110	208	28.2	.256	9.0	9.7	18.7
3	26.6	190	210	24.0	.127	5.7	2.8	8.5
4	32.8	165	260	20.8	.126	7.5	4.0	11.5
5	41.0	145	167	35.6	.246	9.0	5.6	14.6
6	41.0	....	....	....	....	....	....	....
7	32.8	....	....	....	....	....	....	....
8	53.4	115	329	18.6	.162	3.6	9.3	12.9
9	32.8	180	312	18.9	.105	3.4	3.6	7.0
10	32.8	180	334	17.7	.098	4.7	3.6	8.3
11	53.4	115	304	20.2	.175	1.5	9.3	10.8
12	53.4	115	288	21.3	.185	2.6	9.3	11.9
13	53.4	115	300	20.4	.178	4.5	9.3	13.8
14	65.6	90	375	15.7	.175	2.2	14.6	16.8





$v = 115\,D \times \frac{m}{v} = .128$, which gives $D = 0.277$.

Equation 1 may then be written

$$\frac{w}{v} = .277\,\frac{m}{v} + 0.014\,h = 0.014\,(19.8\,\frac{m}{v} + h) \text{ or say}$$

$$\frac{w}{v} = 0.014\,(20\,\frac{m}{v} + h) \ldots\ldots\ldots\ldots\ldots\ldots (II)$$

Trying this on points 9 and 10 whose mean point is $h = 4.0$ and $\frac{w}{v} = .104$, and whose $m = 32.8$ and $v = 180$, by inserting the values of h, m and v, we get:

$$\frac{w}{v} = 0.014\,(20 \times \frac{32.8}{180} + 4.0) = .107,$$ which agrees well with the actual value of .104.

Again with points 1 and 5 with a mean of $h = 9.3$ and $\frac{w}{v} = .22$, for $m = 41.0$ and $v = 145$ we have:

$$\frac{w}{v} = 0.014\,(20 \times \frac{41}{145} + 7.4) = .21,$$ which is in fair agreement with the actual value of .22. Similar trials showed that most of the remaining points were not far out. The values of $20\frac{m}{v}$ were entered in column 8 of Table B and those of $h + 20\frac{m}{v}$ in column 9, while in Fig. 2 the values of $\frac{w}{v}$ are plotted against $(h + 20\,\frac{m}{v})$.

The points so obtained show reasonable agreement with the straight line.

$$\frac{w}{v} = 0.014\,(h + 20\,\frac{m}{v}), \text{ or}$$

$$w = 0.014\,hv + .28\,m \ldots\ldots\ldots\ldots\ldots\ldots (III)$$

or t, the total production per wire in tons will be proportional to $\frac{mv}{w} = \frac{mv}{0.014\,hv + .28\,m}$

where m is given in lbs. D. C.,
h " " " inches of mercury,
v " " " feet per minute.

The greatest discrepancy occurring in the actual results obtained is rather over 20%, which is not unreasonable considering the nature of the experiments. It will be noted that part of the readings apply to experiments in which three boxes were used and part to four boxes, while the amount of vacuum used in the different boxes varied very widely, so that on the whole the deductions cover a fairly wide variation of conditions for one machine. We consider that under the circumstances the results obtained are sufficiently encouraging to warrant further investigation on the lines indicated.

In equation (III) as already stated, the term containing h v represents the frictional wear. The term containing m will include chemical action if the effect of the latter in unit time is proportional to the substance of sheet. Other conditions remaining equal, this is not an impossible assumption.

With dirty papers in which the effect of grit deteriorates the wire, as was the case in the present experiments, this effect per unit of time may also not unreasonably be held to be a function of the substance and therefore included in the term containing m.

In practice, however carefully a wire may be treated, the wear will not be absolutely uniform over the whole of its surface. According to Bouyer* a wire under normal conditions should end its useful life solely owing to excessive wear of the weft causing ultimate breakage. The weft will wear most at places where the wire may show a slight depression due to accident or near the seam where the rigidity of the fabric is least.

At these places, the weft wires will all break within small areas either roughly circular in shape, or shaped according to the accidental depression, leaving the warp wires unbroken. Moreover, the quality of the wire will never be absolutely uniform all over.

It follows that even when the wear takes place "normally" there will always be incalculable factors affecting the life of the wire in some small measure, but the effect of these should be so small as not seriously to detract from the practical value of an expression for the life of the wire obtained in some way as we have described.

APPENDIX

Relation Between the Drying Effect of the Suction Boxes and the Vacua Maintained in Them.

One would not unnaturally expect to find a close relationship between the dryness of the sheet after passing the suction boxes and the vacua employed in the latter.

In investigating such relationship, it is necessary to take into account the output of the machine as well as the percentage dryness of the sheet, as these two factors jointly determine the actual quantity of water extracted.

For like deckle widths, the output of the machine is proportional to $m \cdot v$. The smaller the value of $m \cdot v$, the smaller is the actual quantity of water that must be extracted from the sheet in order that a given dryness (d_1) may be obtained.

A convenient way of taking into account the variations of value of $m \cdot v$ is to multiply the term d_1 by the ratio $\frac{m\,v}{m_o v_o}$. Where the value of $m_o v_o$ is a "standard" adopted for the machine.

In the present case the value of $m_o v_o$ is taken as 6000, and the different values of d_1 are accordingly multiplied by $\frac{m\,v}{6000}$, giving the values for the "corrected dryness" (D_1).

In Fig. 3 the values of the corrected dryness so obtained are plotted against the sum of the vacua

* La Papeterie, No. 19, 1921. p. 870.

(h) in the suction boxes. Two straight lines (II and III) are obtained, which correspond to the usual arrangement of suction boxes and to the new arrangement of boxes, respectively. Both straight lines intersect at a point on the axis of D_1 which shows that in both cases, if there were no vacuum in the boxes, the percentage dryness of the sheet on entering the couch would be the same, viz., 7%. This dryness would be due to ordinary drainage on the wire.

The significance of the difference in slope between the two lines is noteworthy.

The equations to the lines are:

Line II $D_1 = 7.0 + .40\,h$ ..... (V)

Line III $D_1 = 7.0 + 2.24\,h$ ..... (VI)

This means that the new arrangement of boxes was $\frac{2.24}{.40} = 5.6$ times more effective in extracting moisture from the sheet than the ordinary arrangement, notwithstanding the higher total vacua employed with the old arrangement in every case.

The actual figure obtained for the improved efficiency applies of course only to the series of tests under discussion. It seems, however, probable that some such improvement would be found under most conditions. The point is of considerable interest as it opens up the whole question of the mechanism of water extraction on the wire.

As far as the action of the suction boxes is concerned we are inclined to think that the improvement obtained with the uninterrupted vacuum is due to the fact that the suction is never released during the whole of the time the sheet is passing over the boxes, but is continuous and gradually increasing in effect. In the usual arrangement of boxes, the release of the suction between the boxes not only permits the sheet to reabsorb the water which has been drawn into the meshes of the wire and to the underside of the sheet, but the sudden application of atmospheric pressure to the underside of the wire tends actually to force the water back into the sheet. Thus the work of moisture extraction has to be recommenced by each box instead of being continuous. Moreover, there is probably a considerably higher loss of vacuum in the usual arrangement due to leakage which can take place at both lips of every box.

With the improved arrangement, similar leakage can be restricted to two lips in all, and will be less per lip owing to the lower pressure differences employed.

This explanation of the marked improvement obtained is speculative, but seems not an unlikely one. Definite information can only be obtained as the result of careful observations made under known conditions over reasonable periods of time. It affords food for reflection that although over 200 million tons of water are extracted annually on the world's machine wires at heavy cost, so little is known regarding the real nature of the processes employed or the factors which govern their efficiency.

Accident Hazards in the Wood Room

Their Correction

By D. B. DAVIES

Superintendent, Sulphite Mill, Northern Paper Mills

HAZARDS of the Wood Room have, in the past few years been greatly reduced, as a result of the safety movement, and through the introduction of better equipment and better engineering methods under the direction of the Paper and Pulp Section of the National Safety Council. There are, however, many dangerous places in the Wood Room, as evidenced by the number of accidents occurring, and I will attempt herein to call attention to some of them:

Taking a trip through a Wood Room, beginning at the log haul-up and ending in the chip bin, forgetting for the time being the problems usually uppermost in our minds when we are in the Wood Room and viewing the place solely from the standpoint of safety and in the light of past experiences, these suggestions come to mind.

The log haul-up should be provided with a walk, having sufficient width to permit two men to pass each other, and a good hand railing over its entire length. The inclined walk should be cleated. Where it is necessary to cross the log haul-up, a stile with good hand-rails, should be built over it.

The slasher saws, which are being used to a greater extent than formerly, are a source of danger unless properly guarded. The wood usually cut on these saws is light and is easily thrown, especially where odd lengths occur, and a short end is sawn off. A good, substantial wire screen should be placed between the saws and the operators, to act as a target for flying pieces of wood. The meshes should be large enough to afford good visibility. It is of the utmost importance that slasher saws be kept in good condition. Dull saws have a tendency to roll and throw the wood. Aside from the danger to employees, it pays to keep the saws in good condition, because they are frequently ruined on account of being kept in service too long without repairs. The walk around

slasher rigs and haul-up should be substantial, wide, and equipped with good railings. The single plank, springy runway is the cause of many minor, and occasionally serious accidents.

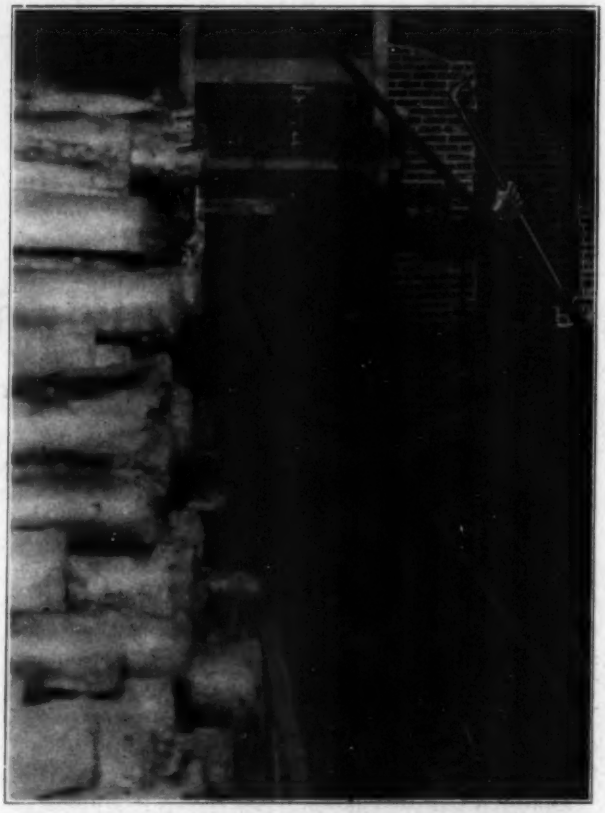
The cut-off saw, though less liable to throw sticks,

A guarded walk, cleated and provided with a good hand-railing over its entire length, reduces accidents on the log haul-up

being used more on large wood, should be provided with a wire mesh guard hung as low as possible. The chain carrier, taking wood from the cut-off, should be run on a level. If these carriers are inclined, a heavy stick will sometimes roll back and strike the revolving saw. This may result in breaking the saw, and consequent danger from flying pieces of steel.

The chain conveyors, used in all Wood Rooms, would seem at first glance to present no danger to employees, yet there are occasional accidents. Men sometimes walk on a moving conveyor in the opposite direction from the travel of the chains, or ride in the same direction. The man may lose his balance and be injured in the fall, or one or both feet may be caught between the moving chain and the stationary sides. The remedy is to provide safe walks along these conveyors. It is hardly to be expected that the men will benefit much from notices posted warning them against this danger, if no provision is made for a better way to go from place to place in the Wood Room. Frequently the lower or return chains on the conveyors are left open, and pieces of wood or bark travel back and become lodged between the chains and the sprocket. The chains stop and some employee has to remove the obstruction. Through misunderstanding or carelessness another man will start the conveyor, which may result in serious injury to the first man. If these conveyors are provided with sides (removable for repairing chains) no pieces of wood or bark can get into the sprockets, incidentally removing the cause of occasional delays.

Injuries to the eyes of knife barker operators are frequent where rough wood, such as hemlock, is barked by this method, especially when the wood is frozen. There is some objection on the part of operators to the use of goggles, because small particles of wet bark stick to the lenses and interfere with vision. But the inconvenience of cleaning the goggles is a small matter by comparison with the risk, and the use of goggles should be insisted upon. When no attachments are provided and the wood is turned by hand, as it still is in some mills, there is danger of the operator's fingers coming in contact with the



Safe walks along these conveyors will invite the workman to use them instead of riding on the conveyor

revolving knives. This usually results in the ends of the fingers being nipped off. There are simple but effective attachments which greatly reduce accidents from this source, incidentally increasing output and reducing shrinkage of wood. The barker discs are usually well constructed of steel or cast iron. If made

of cast iron they are provided with a steel band as a safety measure. It is important, however, that the barkers are run within the safe speed limit set by the manufacturer.

The operation of drum barkers is attended by few risks, and it is only necessary to provide reasonable guards over the driving gear.

The operation of splitting wood may be the cause of painful accidents to fingers or hands. On the horizontal splitter few accidents happen, as the stick is brought to position before the splitting axe by the conveyor, and little adjusting is needed. But with the upright splitter, where it is necessary to place the wood on a stand to bring the upper end under the descending axe, accidents happen. If the axe moves in a vertical line, accidents are due to carelessness on the part of the operators. But some splitters are built so that the blade of the axe while descending and ascending has a circular motion and even a careful operator may get his fingers in the way. This motion of the axe was intended to cause the wood to separate better, which it does. This advantage, however, does not justify its use when the risk is taken into consideration.

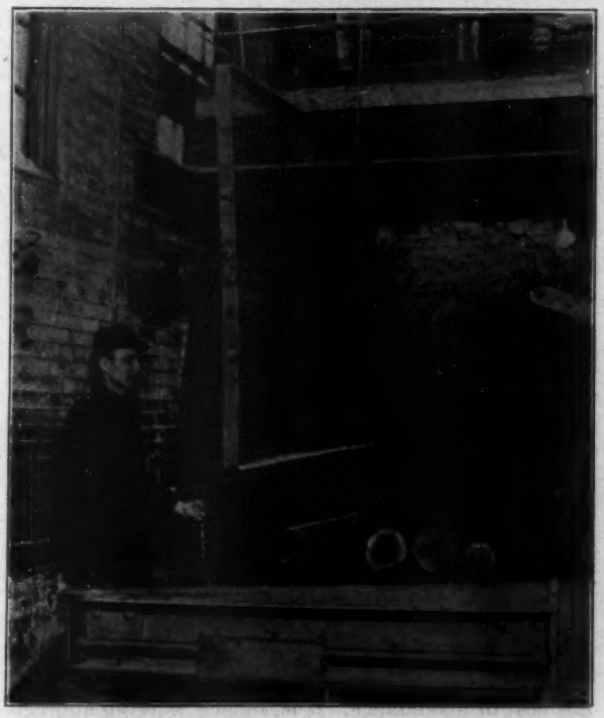
The chipperman is sometimes subjected to considerable risk from tail-end pieces of wood being thrown back through the spout with terrific force. He is more likely to be struck on the head than anywhere else. Where the wood is brought to the chipper on a conveyor elevated several feet above the spout, the danger is greatly lessened. Where this is not possible, a piece of heavy, stiff belting, cut to the shape of the inside of the chipper spout, is very effective. A lug may be left on the belting to permit hanging it to the upper side of the spout opening. A piece of sheet iron hung in this way will prevent pieces of wood from being thrown back, but is dangerous because the hinge may break and the sheet iron falling into the chipper would wreck it.

Where a hog is used for reducing waste wood into fuel sizes, pieces of wood will fly back, but since no attendant is required, the danger can be overcome by building a closed chute leading to the hog. When new knives are put into the hog, the grease or oil with which they are covered to keep them from rusting, should be wiped off carefully, and a little fine sand or quartz sprinkled on the knives. There is then no danger of the knives slipping, when the hog is put in motion.

Helicoid, or worm conveyors, when used for conveying chips, should be covered to prevent employees from stepping into them. The covers can be built in sections convenient for removing when repairs are necessary. If a man steps into one of these conveyors, he is lucky if he escapes with only a mutilated foot.

Safety in the Chip Bin

While the chip bin is not in the Wood Room, it is looked after by the Wood Room foreman, and its hazards can be classed as "Wood Room Hazards." When the chips accumulate in the bins, a man is sent up to spread the chips. If he is working directly over a digester, he may be drawn through when the digester is charged with chips. Even a signal does not always suffice. In one case the cook duly gave the warning signal and proceeded to fill the digester. In a few minutes the man from the bin came through the gate over the digester. He was nearly suffocated and was only saved from falling into the digester by the quick



The cut-off saw should be provided with a wire mesh guard hung as low as possible

action of the cook's helper. He admitted that he had fallen asleep and did not hear the signal. It would seem, therefore, that the only safe way is for the cook to see that the man is safely out of the chip bin before charging the digester.

In case the bin is nearly empty and a man is sent up to poke down the remaining chips, his job can be made safe by providing a belt and rope so that if he slips he will not go down through.

When repairs are made in the Wood Room, anywhere from the log haul-up to the chip bin, it is essential, in the interest of safety, that one man only be held responsible for starting up the machinery. There will then be no misunderstanding and the repair men can do their work in safety. Slackness in this matter is sure to result in accidents.

Of course, all moving parts of machines, pulleys, belts, shafts, etc., where men may come in contact with them, should be guarded, and the guards replaced after being removed for repairing machines.

Perhaps a few words here in regard to guards will not be amiss. We frequently see the twisted and broken remains of belt guards and pulley guards in the scrap pile, while the equipment the guards were made for are running wide open. Our first impulse is to cuss the millwright for his carelessness, but after giving the matter more thought, we are forced to admit that he had to wreck the guards to get them out of his way. If we design the guards so that they can be easily taken off and put on again we will have no trouble in this respect.

The hazards mentioned herein account in the aggregate for many accidents, but it cannot be too strongly emphasized that the greatest need from a safety standpoint is for better planning, more forethought, and better engineering in laying out Wood Rooms. When we have provided good lighting, substantial and safe walks and runways, easy and safe means of moving from place to place, and plenty of room, Wood Room employees will take a more sympathetic interest in our appeals to them by means of posters and bulletins to become "Safety" boosters.

Power Plant Management

Steam Turbine—Part I

By ROBERT JUNE, Assoc. Mem. A. S. M. E.

THE past decade has witnessed a remarkable development of the steam turbine. This development has taken place not only with respect to the design of turbines, but in particular with respect to the very great increase in their application to different services.

Among the classes of work for which steam turbines are now being utilized in addition to the driving of alternating current generators, are the propulsion of pumps, blowers, turbo-compressors and marine propellers. By means of gearing they are used to furnish power for reciprocating air compressors, rolling mill drives and other classes of slow speed machinery. At every point the steam turbine has found favor on account of its low first cost, low maintenance cost, small floor space requirements, and low cost of attendance. It is, indeed, making appreciable progress in relegating the reciprocating steam engine to a secondary and minor position. Although the reciprocating engine will be an important factor in power plant work for some time to come, its field is being rapidly narrowed.

The Principle of the Steam Turbine

Under given pressure and temperature conditions a pound of steam occupies a known volume and contains a definite amount of heat energy. Now, if our pound of steam is permitted to expand to a lower pressure without receiving additional heat or giving up heat to surrounding bodies, it is capable of doing a certain amount of work which will be the same whether the expansion takes place in the cylinder of a reciprocating steam engine, a rotary piston engine, or the nozzles and blades of a steam turbine.

The process of expansion of the steam in the turbine differs from that in the reciprocating engine in that the flow of steam is continuous instead of intermittent. The steam turbine is a continuous mechanism, whereas the reciprocating engine may be termed a ratchet mechanism. The reciprocating engine is designed to operate by the direct pressure of the steam, while the turbine is designed to work by changing the direction of motion of the flowing steam. The turbine is thus, in fact, a velocity motor and the steam engine a pressure motor.

The kinetic energy of fluid in motion is the source of power in the steam turbine. Let a fluid in motion impinge on moving vanes change the direction of flow and reduce the velocity of the fluid, and the energy of the fluid will be converted into mechanical work and become available through the shaft on which the moving vanes are placed.

The successful steam turbine must embody the following characteristics:

1. The highest possible percentage of the heat energy of the steam must be converted into kinetic energy.

2. Provision must be made to utilize this kinetic energy in the most efficient manner by proper design of the rotor, nozzles and guide passages of the turbine.

3. Design and construction of casing, rotor, and blades must be such that they will hold their form and remain tight against leakage under heat and centrifugal strains.

4. The velocity of all moving parts must be within safe limits and the apparatus must run at the proper speed at point of delivery of power.

Advantages of the Steam Turbine

Among the principal advantages of the steam turbine are:

1. **First Cost.** As a general proposition steam turbines are lower in first cost than reciprocating engines of equivalent rated capacity. In a general discussion of this character, little would be gained by reciting specific examples to prove this proposition. This is true because of the various uses to which turbines are applied and on account of the extreme variations in design. However, it is safe to say that

for general service conditions it will be found that the turbine is lower in first cost than the steam engine in four cases out of five. The way to determine the matter in a specific case is to get actual figures from builders of both reciprocating engines and of turbines.

2. **Maintenance and Attendance.** The reciprocating engine contains a much smaller number of parts than the turbine, but on the other hand, the turbine possesses a very great advantage over the other type of prime mover because of fewer moving parts and rubbing surfaces. The only contact between the moving and stationary parts is in the main bearings, and the problem of lubrication is, therefore, a simple one. Furthermore, the absence of pistons, stuffing boxes, dash pots, and friction surfaces, reduces the cost of maintenance and attendance to a minimum and limits the possibility of leaking.

3. **Economy of Space and Foundation.** Reciprocating engines require much greater floor space than do steam turbines. As compared to a Corliss compound engine, a turbine of equivalent size will only take up from one-third to one-half the space. With straight line, non-condensing, high-speed engines, the comparative economy in space is much less marked. However, even in such cases the average space occupied by the turbine is from twenty to fifty per cent. less than that of the engine.

A most important feature of the steam turbine is that it is very much lighter in weight than the reciprocating engine. In the case of central stations, engines and generators may weigh as much as eight times more than turbine installations of equal capacity. Even in smaller installations, the turbine is very much lighter than the engine, and also because of a total absence of vibration, requires a relatively light foundation. In many cases turbine foundations consist simply of steel beams with concrete arches so that the basement underneath may be used for the condenser and other apparatus instead of being devoted to the massive foundation required for reciprocating engines.

4. **Absence of Oil in Condensed Steam.** Requiring as the turbine does no internal lubrication, there is no opportunity for oil to come in contact with the steam. Consequently, all steam from the surface condensers can be used for boiler feeding purposes without purification. This continued use of condensate effects a large saving in cost of feed water and in expense for maintenance and initial cleaning of boilers. Furthermore, the amount of entrained air is reduced to a minimum, and consequently, the work of air pumps is lessened.

5. **Regulation.** It is much easier to regulate the speed of the turbine within close limits than it is a reciprocating engine. With the latter, moreover, a heavy fly-wheel is required to keep the instantaneous angular fluctuation within safe limits. Even with a constant load there are variations of velocity during each revolution of the reciprocating engine, while with the steam turbine the speed is practically constant. A number of published tests of Parsons and Curtis turbines show an average fluctuation of not more than two per cent from no to full load, and of not more than three per cent from no load to one hundred per cent overload.

6. **Overload Capacity.** When we come to discuss overload in a prime mover, we are at some disadvantage because of the fact that the rated load usually refers to the maximum economical load or the point of greatest efficiency. Both engines and turbines should, of course, be designed with the operating conditions clearly in mind so that they will operate at all times, at high economy. The point of superiority of the turbine over the reciprocating engine lies in the fact that when occasion arises it can be operated with a greater percentage of load above the point of high efficiency than can the reciprocating engine.

Comparative Economy of Steam Engines and Turbines

Any attempt at a specific comparison of the steam consumption per brake horse power of reciprocating engines and steam turbines is very unsatisfactory because of the wide range of operating conditions.

As a general proposition, the reciprocating engine is more economical in the use of steam for non-condensing service and the contrary is true for high pressure, high vacuum, condensing service.

The general statement we have just made should be modified so far as it concerns condensing engines of the uniflow or poppet valve type, as these engines, under favorable conditions, often show superior economy to the turbine for sizes up to 3,000 horse power. The superiority of the uniflow and poppet valve engines over the ordinary slide valve type, lies in the fact that their construction is such that the steam is not brought into contact with cold surfaces to the same extent.

A comparison of the curves showing typical economies of high speed, single valve, non-condensing engines, and showing the performance of non-condensing steam turbines, is somewhat in favor of the reciprocating engine, the difference decreasing as the size of the unit increases. When we come to make a similar comparison on the performance curves of compound, single valve; single cylinder, four valve; and compound four valve, non-condensing, reciprocating engines with those of steam turbines of the same size we find a marked increase in economy in favor of the reciprocating engine.

In order to give some definite idea of the steam consumption of the small turbine, we include Table I which gives the manufacturer's guarantee on one of the best known makes.

A very interesting combination plant which has frequently been used in this country consists of a high

pressure engine exhausting into a low pressure condensing turbine. This arrangement is very hard to beat so far as economy is concerned.

It should be kept in mind, however, that there are a great many other factors beside high economy to take into account in deciding whether to purchase a turbine or a reciprocating engine. Every one of the factors mentioned earlier in our discussion under advantages of the steam turbine should be given consideration, and it is quite possible that they will be found to outweigh the advantage of high economy of the engine.

Influence of Superheat on Economy

When plant conditions make it practicable to provide super-heated steam for turbines without incurring more than a normal expenditure, it is desirable to do so. The gain in heat economy due to the use of superheat is theoretically the same for all types of prime movers. Actually, however, the rate of improvement varies considerably with the type of mechanism. In the reciprocating engine the gain is due mainly to the reduction of cylinder condensation, while in the turbine the improvement in economy is due primarily to the reduction in "windage" and other friction losses. The actual gain is, furthermore, very much greater than the theoretical gain. In the ideal frictionless high pressure condensing turbine an increase of 35 degrees in superheat would effect an increase of about one per cent in thermal efficiency. In the actual turbine we gain one per cent increase in thermal efficiency for each 6 to 14 degrees that we increase the superheat.

TABLE I

Performance of the Modern Steam Turbine at Rated Capacity (Manufacturer's Guarantee)

Rated capacity	R.P.M.	Initial pressure, lb. abs.	Back pressure, inches	Superheat, deg. Fahr.	Pounds steam per kw. hr.	Rankine cycle ratio
25 hp.	3,600	165	At.	0	*43.0	*31.0
50 hp.	3,600	165	At.	0	*38.0	*34.2
100 hp.	3,600	165	At.	0	*32.0	*40.6
200 hp.	3,600	165	At.	0	*29.0	*44.9
500 hp.	3,600	165	At.	0	*27.0	*48.1
750 hp.	3,600	165	At.	0	*25.5	*51.0
1,000 hp.	3,600	165	At.	0	*24.75	*57.5
1,500 hp.	3,600	165	At.	0	*24.0	*59.1

* Based on developed horsepower.

Superheat is of greater advantage with non-condensing units than with condensing turbines, and it is more marked with low pressure units than with high. In average practice the maximum temperature of the steam is approximately 500 degrees F., but in large central stations, temperatures of 600 degrees are not uncommon, and a number of recent installations have been designed for total temperatures of 700 degrees F. It should be remembered that the higher the initial temperature, the greater will be the investment cost and that a point will eventually be reached where the increased fixed charges will offset the gain in heat economy.

Influence of High Pressure

In planning new installations it is extremely important to bear in mind the fact that the higher the steam pressure, the higher the economy. As a matter of fact, the increase in efficiency resulting from high boiler pressure is so marked that engineers are considering the possibility of employing pressures far above any now in use. We now have plants designed and in use where the boiler pressure is 350 lbs., and when it is possible to do so, working temperatures of 600 lbs., per square inch will be employed.

There is no particular obstacle so far as the turbine is concerned in the use of such high pressures, since it simply means the use of heavier parts for the high pressure End and a somewhat increased cost of construction. The difficulty lies with the boiler construction, and just when or how the problem will be solved, is still a matter of uncertainty.

Installations at the extremely high pressures just mentioned are and will be chiefly confined to the big central stations. However, it is well to keep the desirability of high pressure in mind in designing a new small plant. In other words, do not assume that a pressure of 150 or 175 lbs., is about right, without giving the matter further consideration. It may prove just as easy, and far more economical, to use a working pressure of 250 or 275 lbs.

The Influence of High Vacuum

High vacuum can be used to much greater advantage with the steam turbine than with the reciprocating engine. Even if it were practical to expand the steam to one pound absolute, the increased condensation in the reciprocating engine would probably render any gain due to expansion, useless. A study of a number of tests of reciprocating engines shows but a slight improvement in overall plant economy due to increased vacuum beyond 26 inches. A test of steam turbines shows a decrease in steam consumption of about five per cent for each inch of vacuum between 25 and 27 inches, six per cent for the gain between 27 and 28 inches, and eight to twelve per cent for the gain between 28 and 29 inches. These values are approximate only, since the influence of vacuum on steam consumption varies greatly with the type and size of turbine.

Here again we must remember that there is a critical point beyond which it is not economical to go in securing high vacuum. As the volume in steam increases very rapidly with the decrease in back pressure, the corresponding capacity and power required by the air and circulating pumps becomes proportionately larger. There is, consequently, a point where the improvement in steam economy fails to exceed the increased power demanded by the auxiliaries.

Turbines vs. Engines in Units of Small Capacity

The question of whether to use reciprocating engine or turbine is frequently a puzzling one to the owners of small plants. Some years ago, Mr. K. S. Barstow presented a complete summary before the A. S. M. E. covering the applicability of engines and turbines for plants of less than 500 horse power capacity. In studying this summary it is well to remember that considerable improvements in the turbine and its range of applicability have been made in the past several years, and that it is possible to use turbines in at least some of the applications assigned by Mr. Barstow to engines.

Applicability of Engines

(1) Non-condensing units, direct-connected or belted and used for driving.

Electric generators of all classes excepting exciter sets of small capacity, unless belted from the main engine. Centrifugal pumping machinery, operating under variable head and quality conditions and at relatively low heads, say up to 100 ft., depending on the capacity of the unit. Pumps and compressors for delivering water or gases in relatively small quantities and at relatively high pressures in the case of pumps at pressures above 100 lb. per square inch and in the case of compressors at pressures from 1 lb. per square inch and above.

Fans and blowers (including induced draft fans) for handling air in variable quantities and at relatively low pressures, say not over five-inch water column.

Line shafts of mills where the driven apparatus is closely grouped and the load factor is good.

All apparatus requiring reversal in direction of rotation, as in hoisting engines and engines for traction purposes.

(2) Condensing units direct-connected or belted, for all the above purposes, particularly where the condensing water supply is limited, and where the water must be recooled and recirculated.

Applicability of Turbines

(1) Direct-connected units, operating condensing. 60-cycle generators in all sizes, also 25-cycle generators above 1,000-k. w. capacity.

Direct-Current generators in sizes up to 1,000-k. w. capacity, including exciter units of all sizes.

Centrifugal pumping machinery operating under substantially constant head and quantity conditions, and at moderately high head, say from 100 ft. up, depending upon the size of the unit.

Fans and blowers for delivering air at pressures from one-and-one-half-inch water column to thirty pounds per square inch.

(2) Direct-connected units, operating non-condensing for all the above purposes, in those cases wherein steam economy is not the prime factor or where the exhaust steam can be completely utilized, and, in the latter case, particularly where oil-free exhaust steam is desirable or essential.

(3) Geared units, operating either condensing or non-condensing for all the above mentioned applications, and in addition, many others which would otherwise fall in the category of the steam engine, on account of the relatively slow speed of the apparatus to be driven.

Next month we will discuss the individual types of turbines and deal with some of the problems incurred in their operation.

Removes Drain Pipe Obstructions

THE Victory Self Propelling Nozzle, one man, water (25 lbs. pressure or more per square inch), and hose will remove blockades from sewers, drains and stock lines in less time, with less trouble and for less money than it can be done in any other way. This tool avoids digging up clogged pipes and the removal of clogged stock lines. It automatically locates and breaks up stoppages.

Instead of using rods, which are apt to pack the blockade even tighter than it was before, this self propelling nozzle travels under its own power, without pushing or shoving, right up to the obstruction, and the water breaks up the blockade in record time.

The nozzle is made from high grade bronze castings, with a small forward hole and six large rearward holes in the dome. Diagonal flanges are cast in the neck, which is connected with a threaded butt by a ball-bearing swivel. The diagonal flanges and ball-bearings give the nozzle its revolving motion with a minimum of friction. The force of the water entering the dome pushes it forward, sky-rocket fashion, about twenty-five feet a minute, pulling the hose after it, until it reaches the stoppage.

The forward stream of water breaks up the stoppage and the rearward stream washes it away. While this is going on, the nozzle is rapidly revolving, throwing the forcible forward stream of water against the walls of the drain, so that, as well as breaking up the blockade, it is being thoroughly cleansed.

This tool is made in two sizes, and will clean stock lines, sewers or drains 2½ inches in diameter and larger.

The Salesman as an Evangel for Good Business

By LAWRENCE H. SLOAN
Managing Editor, Standard Statistics Service, New York

Presented at the Meeting of the Salesmen's Association of the Paper Industry on April 11, 1922, at the Waldorf-Astoria Hotel, New York.

I AM HERE as a rank outsider who has been repeatedly cautioned that, for all present purposes, brevity is the cardinal virtue. I received an invitation to talk with you, briefly; I replied that I should consider it an honor to talk with you, briefly; in the acknowledgment of my acceptance I was assured that you gentlemen would be glad to hear me, briefly.

It was very interesting to learn that salesmen had become concerned about brevity. I have personally accused the calling which you gentlemen so ably represent of a great many terrible things; but I must confess that it had never occurred to me to accuse you of brevity. During the three years that I was advertising manager for The National City Bank of New York a never ending stream of salesmen kept the chair beside my desk nice and warm. They were of all types and of all degrees, from the timid little amateur whose strongest argument was that he thought he deserved a share of your business, up along the line to the regular, stand-up-and-look-you-in-the-eye 75 millimeter fellows who had mastered the last word of technic in this wonderful adventure of selling. Whenever I looked up and saw one of the 75 millimeter salesmen striding through the door, I instinctively buttoned up my vest, so I'd be sure not to lose my shirt. In that relentless battle which I had to wage single-handed against the masterful army of salesmen, all bent upon the the single objective of getting your name on the dotted line, I learned many of your ways and many of your wiles. But as I suggest, the little matter of brevity must have developed among salesmen since I moved away from the City Bank. That was six months ago.

In thinking back over the hundreds of salesmen with whom I have had the pleasure of dealing, I believe the ones who were always the most welcome, no matter how busy the hour nor how little the need for their wares, were the ones who had something to tell me that I wanted to know—something that I didn't know, and probably wouldn't have found out any other way. I had thought I had discovered just such a gem of a salesman shortly after prohibition went into effect. He leaned across my desk and whispered the recipe very confidentially. All that was needed was a cake of yeast, a bottle of Welch's grape juice and two weeks' time. I believed him. I put the whole matter to the test of taste at 8 o'clock one evening. The doctor was called in at 9 o'clock, and looked in again the next morning. Four days later I was back at business again. My informant never showed up again to ask how it turned out. Some fellows always were lucky.

There is more of a moral for you gentlemen in that unhappy situation than you may suspect. When you take the responsibility of giving extraneous information to your customers, be sure that you are right. It is dangerous to take the responsibility of passing along hearsay recipes. The practise contraverts the fundamental principles of modern salesmanship.

You gentlemen who are devoting every working day of your lives to the tasks of selling goods probably have your faces too close up against the picture to see it in its true perspective. But although you may be too modest to say it for yourselves, there are many of us who are frank to say for you that you are one of the most potential forces in our whole business organism today. There are any number of business executives with whom you have more influence than either the pulpit or the press. Men who are spending their companies' money must rely upon your mere word as they rely upon the Bible. If you can tel' them that paper prices are going to rise or are going to fall, you can save them thousands and thousands of dollars.

Relation to Customer

There is an intimacy of relationship between yourself and your customers which, I am certain, means fully as much to the man on the other side of the desk as it means to you. You are in a sense their listening posts. You are in touch with all manner of man with all manner of businesses. You are a clearing house of information. The very nature of your word places you in a position to assimilate a great number of facts which the other people should know, and if you have the additional advantage of being able to analyze these facts and pass well seasoned opinion along to others, your opportunity for helping the cause of good business becomes all the more great.

Because of your peculiar advantages for collecting facts about business, and because of your intimate relationship with men of affairs and with men who place untold confidence in what you tell them, your position is unique for being real evangels of good business.

One of the first questions your customer will ask you is: "Well, how's business?" It is a trite phrase;

it is used so often that it has come to be a salutation, just as much as "Well, good morning, Mr. Jones," or as "Well, Jack, how're you feeling today?" The only difference is that when your customer asks you how you're feeling, he really doesn't give a whoop whether you've got a stomach ache or an ingrown toe-nail. He has a stomach and a toe of his own to worry about, and the momentary welfare of yours is more a matter of passing politeness to him than of real concern. But when he asks how business is, he really wants to know. He is responsible, along with others, for the profits of the particular business that he represents, and he is hungry for every scrap of information that will help him in forming judgments that will accrue to the benefit of his firm.

And he doesn't mean to inquire exclusively about business in the paper trades. He wants to get your opinion about business as a whole—to find out what the other fellow is doing, whether that industry is falling back or this one gaining in its pace, etc.

A Student of General Business

And that brings me to the whole point of this talk —this brief talk. What do you tell folks when they ask you how business is? Because of my own interest in business conditions as a whole, I may be inclined to over-emphasize this phase of one thing, but I maintain that it behooves every good salesman to be the closest student of general business affairs, to have accurate information regarding business conditions constantly at his fingers' ends, and, wherever the opportunity presents, to relay this information along to others.

Do your customers all know, for example, that prices, which over a long period of months have been dropping, are now stabilizing and even beginning to move upward again? Do they know that bank clearings over the country are slowly expanding, and that this fact gives one of the clearest signals of the return of business prosperity? Do they know the rate at which the production of steel is increasing, and that the measure of this ratio has, in years past, always given an accurate index to the state of the country's prosperity as a whole? Do they know how much freight rates are likely to be reduced during the next few months? Do they know how much coal there is in storage in the United States today, and how much they need to worry about the coal strike? Do they know what the proposed duty on wool will mean to the price of woolen fabrics next fall? Do they know, finally, just how far business revival has gone since the dark days of last summer? Do they know that the upward movement now is in full swing, that the time for calamity howling is over, and that this is the time to strip off their coats and pull out into full stream, ready for the period of business prosperity that is just around the next curve?

They ought to know these things. The country would be better for it if every business man appreciated them, business would be better for it; you and your employers would be better for it because the buying habits of your customers would be materially altered if they actually realized just what stage the price cycle had reached by this 11th day of April, 1922.

We are entering an era, gentlemen, when business as a whole is going to be more carefully and more scientifically studied than ever before in our economic hstory. The time has passed when one is considered a "good business man" if he has at his command merely an array of facts bearing directly upon his own business. More every day we are coming to realize the close inter-relation of every line of business—how each line is merged into one vast, intricate organism, that runs along smoothly when all of the major parts are working well, but which limps and whines and creaks miserably when the major parts are out of joint. The next ten or twenty years will witness much scientific achievement in the study of business facts. Business men everywhere are hungry for the information that will help set them right when they want to know: "How's business today?"

Why Should Depression Exist?

I call your attention for just a second to this chart which I have brought up to show you. The heavy wavy line is not a picture of a fishing worm or St. George's dragon or a piece of copper wire found in the gutter. It is nothing more than a photograph of business during the past half century.

Every time the curve crosses the normal line, we have prosperity; every time it drops below the normal line, we have depression—mills closed down, people out of work, prices uncertain, buying on a hand to mouth basis, curtailed use of paper, and all the other evils of "hard times."

There is today a tide of mighty anger rising against this very harmless looking little black line that I have shown you. Thoughtful men are unable to convince themselves that it need be such a crooked line. They see no more reason why business depression has to follow business prosperity than there is reason why a man who has been well and strong for a couple of years had to go to bed for the next couple of years to recuperate.

In mass formation, intelligent men everywhere are moving against this crooked line, and much of their time and thought during the next decade or so is going to be given to the Herculean task of making the curve show much less variation. There is no reason under Heaven why they should not succeed. Business depression has always, in the past, followed business prosperity. But that is no reason why the endless chain of bad times and good times should go on eternally, unbroken.

Disseminate Correct Information

You salesmen are in a peculiarly happy position to help in this battle that is going to be waged against

hard times. One of the surest ways to cure the situation is through the dissemination of correct information about business among all business men. There is a personal relationship between yourselves and the men to whom you sell that makes the things you say mean much more than when your customer reads the same information in his newspaper or in his trade journal. He would much rather say to his Board of Directors: "Mr. Binks of the Jones & Smith Company has conclusively shown me that prices are starting upward again," than to tell them, "I see by the newspapers, etc."

I fancy also that advertising will have something to do with the process of straightening out the crooked business curve. I am certain that good salesmanship will have a great deal to do with it. If your customers can always be made to understand the business situation as a whole thoroughly, and at all times, if they can be brought to a point where they will not shy at false bogies, their buying will take on a much more even character.

Am I not correct, then, in calling the salesmen of this country the real evangels of good business? And I am not losing sight for a moment of the fact that your houses pay you to sell goods, rather than to transform yourselves into a walking trade journal. All well and good. But salesmanship has long since ceased to be a matter of knock 'em down—take it away from 'em. Salesmanship is a matter of service. He sells most who serves best. How can you serve your own houses, your own industry, or yourselves, better than by always keeping yourself in a position to answer, truthfully and correctly, the monotonous query, "How's business?"

Hydrating Machinery for the Paper Mill

By GEORGE L. BIDWELL
Warren Mfg. Co., Riegelsville, Pa.

Presented at the Seventh Annual Meeting of the Technical Association of the Pulp and Paper Industry, on April 12, 1922, at the Waldorf-Astoria Hotel, New York.

WE ARE indebted to some member of the Technical Association for the following definition of hydration:

"In every day language hydration is defined as the gelatinizing of the fiber by taking on water. Hydrated fibers are gelatinous and swollen. They offer resistance to water passing through them, and the more they are hydrated the more resistance they offer. Hydration gives to a mixture of pulp and water characteristics similar to those possessed by a viscous fluid. The degree of hydration as measured by viscosity is a very important indication of the condition of the stock."

The Object of Beating Paper Stock

Having before us such a good definition of "hydration," it is easy to see that the object of beating paper stock is to attain a certain degree of hydration. This varies with different grades of paper. The hydration of the fiber is controlled first by the consistency of the furnish, and with the consistency of furnish under control, the degree of hydration next depends upon the condition of the bars in the beater roll and the bed plates. When more than one beater is used for a paper machine it is highly important that every beater roll be in good condition. The pressure of the roll on the bed plate is measured by "rule of thumb" if mechanically driven. With electric drives this pressure is measured by the ammeter reading. With the rolls in good condition and all having the same bucket capacity, the beater man can gauge very accurately what he is doing.

Most every paper maker is looking for a cheaper way to hydrate stock and at the same time find a more accurate control of the degree of hydration. In a recent issue of Paper we find an article which leads us to wonder if sometime, in the near future, our beater rooms will be cleared of the heavy, ponderous equipment of today and be replaced by apparatus that will give the desired result by chemical treatment.

Chemical Hydration Not Yet Practiced

Chemical hydration has not yet been put in practice in the paper mill. The stock packer has heard a little something about this theory. He used to send us bone dry harbor rope but since learning that fiber soaked in water 24 hours will start hydrating without the aid of any mechanical means, he now aims to give the paper maker harbor rope with at least 15 per cent moisture in it. Furthermore, many have standardized on this amount of moisture and sanction the packing of harbor rope with 15 per cent of moisture. If we find more than 15 per cent of moisture in harbor rope, the packer is summoned. He explains that when the rope was packed, he did not know its destination and thought it would be shipped to some paper maker who has more advanced ideas on the value of water as an aid to chemical hydration.

The machinery builder is also trying to help out in a mechanical way. An attachment is now on the market that can be placed in any Hollander, beater or washer. It is claimed that this attachment doubles and trebles circulation without additional power. Circulation is at the rate of from 50 to 120 feet per minute at a consistency of from 9 to 12 per cent and that an engine so equipped will do the work of three ordinary hollanders. Other advantages claimed are low cost and small amount of floor space, cheaper

beater room construction and a superior quality and finish of product.

Same Problem Whatever the Furnish

Raw material of great variety is used in making paper. The following stock consumes enormous quantities of power in the hydrating process: Harbor rope, jute fibers, new overall cuttings, new linen and cotton threads, and cotton linters. Fibers of this kind are used in the manufacture of rope, jute and rag specialties where strength is the dominating factor. We next have sulphate pulp and hard sulphites. The power consumption is somewhat less on these fibers, but they produce very good wrapping paper and some high class specialties. Soda pulp and the softer sulphites require still less power but are very useful in producing certain characteristics in a sheet of paper. All these fibers may be bleached or unbleached. Whatever the furnish, the problem is the same. We must attain the desired degree of hydration of the fiber with the least possible consumption of power and the hydration must be carried to the same degree in every beater of stock prepared for a given grade.

The following beaters are advertised as power savers: The Niagara, Shlick, Rabus, Umpherston and the Universal.

What Beater Makers Are Trying to Do

Almost every manufacturer of beaters can give you many reasons why his beater roll will outwear any other on the market. It may have the bars shimmed in and secured with bands of superior steel; or it may be a bandless beater roll with bars held by keys, dovetailed slots, dovetailed lugs, slotless bars, wedges and lock nuts. All this shows an effort in the right direction. They are trying hard to give the paper maker an indestructible beater roll. One that will have the same cutting surfaces and bucket capacity every day in the year. One in which the wood filling will not raise. When they accomplish this, you will find, if you use a half dozen beaters to supply a paper machine, that they will all bring the stock to the same degree of hydration in a given length of time. It will be necessary to furnish them all the same consistency and apply the same amount of pressure on the bed plate. These two elements are already controlled in a modern beater room. A speedometer shows the surface speed of the stock and ammeter shows the amount of pressure applied to the bed plate. What you must have is a perfect beater roll in every hollander that supplies your machine. If you decide to do it with one of the new type beaters that move a stiff consistency stock at a high surface speed, this roll should be indestructible and present the same cutting surface to the stock continually. If you use several standard hollander beaters, all the more reason why you should have indestructible beater rolls.

Until recently, standard wood and steel fillings were used in washers, beaters, Claflins and jordans manufactured by some of the best builders of paper mill machinery in the country. These standard fillings are now being superseded by what is considered indestructible material. This came about as follows:

In November, 1919, we read in THE PAPER INDUSTRY this statement credited to N. C. Nash of the Lakeside Paper Co.:

Fifty Years Behind the Times

"My opinion is that the best machinery on the market at the present time for refining stock is fifty years behind the times, being all out of proportion, great power and labor consumers and one of the largest factors in the high cost of paper manufacture.

"I believe that improvements for machinery of this kind have been neglected and given less thought than any other machinery in the world, and believe a better product could be manufactured at a greatly reduced cost, a large saving of steel, iron and fuel and a great reduction of labor.

"Let us all get together and give this part of the mill a little study and formulate our views, then submit them to the paper machinery builders, they are the boys who will try and give us what is needed. We must start immediately or we will drift along in the same old rut for another fifty years."

Use of Manganese Steel

This message from Mr. Nash struck the writer very forcibly as did also an advertisement issued at this time by a steel plant. This advertisement shows a mammoth cast steel gear wheel which was said to have been used to drive placer gold dredges in California. The steel was described as manganese steel and the advertisement went on to give its many good qualities which checked up with just what the paper makers need for washer bars, beater bars and filling for Claflin continuous beaters and jordan refining engines.

We soon got in touch with the steel plant and by January, 1920, we had in use a 48 in. x 48 in. washer roll made of this material. The blades are cast integral with segments which are riveted to spiders mounted on the shaft and no wood pieces at all are used. It was put to work without grinding at the mill as it was ground with abrasive wheels to a true circle at the steel plant and fitted nicely the circle of our bed plate. After two years' service we cannot find any perceptible wear. Manganese steel was invented by Robert Hadfield, a leader in the British steel industry, and has been made in this country since 1892, but its application to paper machinery is new. The steel is very tough, presenting the same cutting edge day after day. We have uniform bucket capacity for lifting the stock over the backfall so that the same surface speed can be attained in every beater. This roll has been adopted as standard for all

our washers and beaters as we consider it mechanically and chemically indestructible.

After proving that this metal was the best that could be had for paper making, we had the same steel mill get our liners and homogeneous plugs for our Claflins, beaters and jordan refining engines. As in the beaters, the blades are cast integral with the plugs and liners and no wood pieces are used in the construction. We find this filling runs without vibration. We use direct connected motors running the Claflins and jordans. The ammeter reading shows the amperes according to the nature of the stock being refined. High speed could not be attained with a wood filled jordan as the vibration would loosen the filling. In August, 1921, we started a new four cylinder paper machine on rope and jute paper. This machine has six 1,000 lb. washers, six 1,000 lb. beaters, two continuous Claflin beaters and two jordan refining engines following it. The entire equipment is manganese steel. The results obtained with this equipment are very gratifying and we are now rebuilding an abandoned plant and giving it the same kind of equipment.

Some Advantages

The steel plant referred to in this paper is located at High Bridge, N. J., and is known as the Taylor-Wharton Iron and Steel Company. They build hydrating machinery for the paper mill. The beater and washer rolls have the following advantages:

(a) The roll is practically indestructible.

(b) The roll bars show so little wear that the tackle is practically the same every day in the year. This results in uniform paper. Too much stress cannot be given to having uniform tackle. Roll bars that hold up their edge and are not easily battered result in uniform product. The beaterman knowing the condition of his tackle, and it being practically the same every day in the year, is able to do much more accurate work. In fact, his work becomes nearer an "exact science."

(c) The character of manganese steel in the segmental bar tends to "draw" the fiber more, and as the edge is in such good condition, considerably less power is consumed in producing a given degree of hydration.

(d) The absence of wood filling in the roll insures the same bucket capacity as there is no trouble from raised fillings. There is no repair or millwright work to be done on the roll. It goes to work without any grinding as the roll is finished to a true circle in the shop.

(e) The manganese tackle can be used on the finest papers as it does not rust but takes on a "battleship gray" color except for the cutting edge, which stays bright and highly polished. There is no metal found in the finished paper that is traceable to manganese bars.

(f) Where heat must be applied to the beater, the roll will last a lifetime, as it cannot be affected by heat. Manganese steel is very tough and durable, standing up under and enduring the corrosive and abrasive action of chemicals and contact with the bed plate.

(g) The paper produced using manganese beater and washer bars is superior in strength, finish and general appearance to paper made with the ordinary steel bar and wood filled beater roll. This has been proven on rag, rope, jute and wood papers.

The Small Paper Mill's Finishing Room and Its Auxiliaries

By H. M. GRASSELT

PAPER MILLS, like other industries, continually present new problems, and methods very often must be changed to meet new conditions. Today, keen domestic and revived foreign competition, the tendency of many buyers to substitute "something cheaper" will compel many a small fine paper mill to adopt some system of organization and efficiency to provide improvements in order to successfully meet competition and retain a ready market for its products.

Since, for obvious reasons, not always the most modern machines and devices can be acquired to have the equipment at any time up-to-date, at least each department should be made the subject of a thorough study as to lay-out and working conditions. All obstacles to a higher production and the workman's best performance should be removed and such economics as are possible without impairing the quality of the product should be introduced. To the employees, the idea of "Team Work" should be instilled, and the fact, that the company's success means their own, should be brought home to them when the occasion affords.

The installation and maintenance of a cost system is another and one of the most important factors in transacting of business on a sound basis. The system may be as simple and inexpensive as possible, but it must give absolutely reliable figures and eliminate all guess work. Many an out-right failure or failure of even showing the smallest profit at the end of a year under otherwise normal industrial conditions, may be ascribed directly either to the entire lack of a cost system or one based on inadequate calculations.

However, it is not the purpose of this article to

expound the merits of one or the other method of cost finding, but to deal with the subject outlined in the title.

The Finishing Room

Great facility may be added to the work in the finishing room by so arranging its lay-out as to conform with the various phases of procedure. An ideal condition is one in which, for instance, the calenders are near the source of supply (paper machines, cutters or lofts, whatever the case may be), and where the calendered product can be moved steadily from one operation to the next without much interruption or extra handling.

There are instances in which a simple re-arrangement of tables not only eliminated extra trucking and carrying, but actually increased the output considerably.

Delays waste the workman's time, he must be continually supplied with materials to attain the best possible results.

Piece Work System

Many of the operations, as sorting, counting, trimming and sealing should be paid at a piece rate system. Especially mills operating pasting machines and platers should, at any rate, introduce a piece work system. It is an incentive to be reckoned with and its results are, in practically every case, more than gratifying.

A bonus or premium system also helps to stimulate efficiency and increase production.

The introduction of piece rates requires careful time study in order to determine a fair rate. It is a very poor practice to cut rates when the workman begins to earn high wages through greater efforts on his part. Piece work must also not create a tendency to turn out inferior work, its rates should be based upon scientifically determined data and not upon an ordinary try-out or old records.

Sealing and Packing

A line of standard wrappers and labels will give the product a distinct and pleasing appearance. The former must be of durable quality and not faded or discolored. Bond paper should be sealed with card board at top and bottom, sealing tape to harmonize with the color of the wrapper.

Case Lining

Cases should be lined with waterproof paper, corners to be filled with specially cut pieces of the same paper; inside of the waterproof lining a gray wrapper should be used.

Cases

Mills manufacturing standard lines should adopt standard cases to hold full reams aggregating about 525 lbs. net. Cases are to be made of the necessary depth and length to absolutely insure against movement of paper. Particular care is to be given to the depth, so that the cover may be drawn down as tight as possible.

Bundles

As a rule, fine mills do not ship in bundles. Cover stock and similar grades are packed in bundles with solid frames. The inner wrap consists of a gray wrapper, the outer of waterproof lining. Usually the bundles are tied with sisal. Strap iron, however, gives excellent service and warrants a safe arrival of goods that are shipped "less than carload" and have to stand repeated handling in transit.

Other cheaper grades are shipped in bundles with stiff card board tops and bottoms under the outer wrapper.

Rolls

A secure roll wrapping consists of one thickness each of waterproof wrap and heavy gray wrapping paper and one inside and one outside head. The edges of the rolls must be protected with so-called "collars" in two or three thicknesses of wrap.

Storage of Paper

A temperature of sixty degrees, kept as uniform as possible throughout the seasons, is considered most desirable for a paper storeroom. Windows should be provided with heavy curtains, preferably of a dark blue color, so that the goods will be protected against the destructive power of sunlight.

Paper should be stored on platforms, resting on blocks of about six inches height. Grades, sizes and weights to be kept separate. The individual piles or rows should be provided with a card, showing grade, size and so forth, of the paper; this will facilitate filling of orders and taking of physical inventories.

The man in charge of the stock room should endeavor to intelligently turn-over the stock, i. e., the oldest lots are to be used up entirely before shipments from any subsequent run are made.

Stock Control

In many small mills the finishing room foreman or one appointed by him keeps a stock book, carrying a perpetual inventory. Although this practice has its advantages a card system kept in the office is preferable.

It releases the foreman from clerical work for supervisory duties and eliminates many trips to the mill by office help. Especially a mill which receives many inquiries over the telephone will, for obvious reasons, find a perpetual inventory, kept in the office, of advantage.

To have a perpetual paper inventory means to have always correct figures about stock on hand available. To-day's demands for "Service" necessitates prompt shipments from stock, and this is possible only with dependable records on hand, which show at a glance the status of any item in stock. Thus the manufacturer can plan in ample time new runs to replenish the stock and fill incoming orders promptly.

It need not be emphasized that a reliable perpetual

Grade and W/Mark	Color	Wove or laid	Size and Weight	Card No.

Taken in Stock				Taken from Stock					Balance on Hand
Date	Production Order	Reams Rolls	Pounds	Date	Sales No.	Shipment No.	Reams Rolls	Pounds	

Form 1—Actual Size 5x8. Regular Index, Printed Both Sides

paper inventory affords an accurate check on the physical inventory.

Entries must be made daily; they are a matter of only a few minutes. Of course, only stock lines need to be carried on the perpetual inventory; to enter stock made for a customer for immediate shipment after manufacture, would mean wasting of time. Form 1—Inventory Card—is self-explanatory. It may be added that many manufacturers prefer to have a column "On Order" in addition to those shown on the card, so that orders may be entered immediately after receipt, and the balance then will show the quantity of stock available, even if the order has not yet left the mill.

However, only a properly kept, up-to-date, perpetual paper inventory is of actual value, and the person handling the work should bear the fact constantly in mind.

The figures for the inventory cards are to be obtained from the "Trimming Reports."

In these, the knife men will enter their daily production, and hand them at the end of the day to the office.

Issues from stock are taken care of by the Ship-

Knife No. ..... TRIMMING REPORT Date.....

Production No.	Grade	Color	Size and Weight	Reams Trimmed			Remarks
				Perfect	Medium	Salable Brokens Lbs.	

Form 2—Actual Size 8½x5½

No. _____

Customer: _____

Street _____ City _____

Ship to: _____

Route:	Collect Prepay	Sales No.	Customer's No.	Date order Rec'd

	Grade	Color	Size and Weight	Instructions
Reams Rolls Pounds				

Date Wanted: Shipped—Specification Date Shipped: B/L No.

Production No.	Rolls	Bdls.	Case No.	Reams	Gross	Tare	Net	Nom.	Billing Wt.

Form 3—Actual Size 8½x11. Heading up to "Shipped-Specification" to be filled out in office. To be made out in triplicate. Original and one carbon copy to mill, one carbon copy to be retained at office to follow up order. Carbon copy returned from mill fully filled out may be sent to customer as specification to invoice. Original filed with second carbon copy

ping Record. Name of customer, order number, grade, size, weight and color, how to ship and so on, are to be entered in the office, and the sheet given to the stock room man, who takes the required stock to the packer. The packer determines number of reams, gross, tare and net weight, and enters the itemized contents of the shipment in the columns provided for in the record. After shipper and billing clerk have used the record for their respective work, the inventory clerk will receive it and make the necessary entries in his cards and eventually file it away.

There are mills which have in place of these records a certain "Production Order" form, with columns provided for every phase of process. The sheet goes from the paper machine through the various departments to the stock or shipping room, respectively. Each department makes its respective entry of time spent on the particular operation, quantity and so on, in the columns provided for them, so that the sheet eventually contains all details and costs of that particular run.

Miscellaneous Hints

Slips containing the number of the sorter, counter and knife man should be put into the individual reams, so that complaints of any nature may be easily traced to their origin. Just a small sip of colored, or when used for colored paper, white paper, printed as follows:

This paper has been
Sorted by No....
Counted " No....
Trimmed " No....

will suffice. Papers shipped in rolls should contain a similar slip with the initials or number of the machine tender.

Even the most efficiently managed mill will have rejections now and then. Whenever a quantity of paper has been returned on account of imperfections, and cannot be re-sold as Perfects, the lot should be entered on an inventory card and given a certain number for identification. The sales manager should then try to sell the paper at once as a Special Lot at the best possible price, instead of having it lying around the mill for months and months.

Brokens in double size should be split to single size and then re-sorted into Perfects and Salable Brokens, or Perfects Mediums and Salable Brokens. The latter may be disposed of as Salable Broken to dealers or manufacturers of pads. There is always a ready market for bond and other fine paper brokens.

It also pays, in many instances, to cut the Salable Brokens into Typewriter size, 8½x11, and box or wrap and seal five hundred sheets neatly, provide an attractive label and offer the goods to the dealers. There are also mills that make pads from the brokens and sell them.

The final disposal or conversion of Bond broken (or any other fine paper broken) depends to a certain extent upon the location of the mill; a mill situated in an industrial district may find it more profitable to sell its brokens as Salable Brokens to converters or dealers, while another, located not quite so fortunately, may obtain better returns from converting that particular stock into typewriter papers or pads.

Many mills, too, are able to make arrangements with their regular customers, whereby they may ship to them all Salable Brokens alongside with the regular stock of any make order.

Analysis of Reclaimed Cooking Acid for Sulphite Mills

By GOSTA P. GENBERG

Presented at the Seventh Annual Meeting of the Technical Association of the Pulp and Paper Industry, on April 12, 1922, at the Waldorf-Astoria Hotel, New York.

IN ANALYZING reclaimed cooking acid, especially when side-relief is used, large errors are likely to occur in determination of the combined SO_2 and the CaO by the methods suggested by Höhn and Winkler. Both of these methods give an altogether too low result for CaO when calculated from the combined SO_2.

According to Höhn and Winkler, the free SO_2 is determined by titration with N/10 NaOH and the combined SO_2 calculated from the same titration by subtracting the free SO_2 from the total SO_2 determined by titration with N/10 iodine solution. The CaO is then calculated from the combined SO_2. Evidently the titration with N/10 NaOH must be in error due to the presence in the reclaimed cooking acid, of such organic acids as formic and acetic acid, which are formed during the cooking operation and carried back into for cooking acid by the use of the side-relief. Another factor that might make an error in the estimation of the free SO_2 by these methods, is the possible presence of free CO_2 in the acid made from lime rock as pointed out by Oman. These two factors make the result for free SO_2 too high and eventually the combined SO_2 and the CaO will be too low.

For control in the laboratory when a reliable analysis is desired, the following method is suggested:

Total SO_2

Withdraw 20 c.c. of the reclaimed acid under pres-

sure and dilute to 500 c.c. in a half-liter flask. Fill the solution in a 50 c.c. burette. Fill another burette with N/16 iodine solution. Take the top readings of the two burettes and run the I_2 solution down in an Ehrlenmayer flask. Let the diluted acid solution run down in the iodine solution until the yellow color disappears. Add more iodine solution until slightly yellow, add the starch indicator and fix the end point. Take the bottom readings.

a = acid reading in c.c.
b = iodine reading in c.c.

$$\frac{5 \times b}{a} = \text{per cent total } SO_2$$

Note: This manipulation eliminates the tendency toward reversibility of the reaction, as

$$SO_2 + I_2 + H_2O = SO_3 + 2HI$$

to

$$4HI + SO_2 = 2H_2O + 2I_2 + S_2$$

Organic Matter

Withdraw with pipette 50 c.c. of reclaimed acid in a beaker, add 50 c.c. concentrated HCl and evaporate to dryness. Take up in 5 c.c. HCl and 100 c.c. water, and boil for ten minutes. Filter while hot and wash six times with hot water. Dry at 105° C. and weigh the organic matter.

Note: This does not give the actual organic matter present, but is comparative only.

Sulphur Trioxide

The filtrate from above (2) is boiled for five minutes and 50 c.c. boiling $BaCl_2$ solution added. Continue the boiling for five minutes. Allow the precipitate of $BaSO_4$ to settle over night. Filter, wash until free from Cl-ions, ignite and weigh.

a = weight of $BaSO_4$

$0.343 \times 2 \times a$ = per cent SO_2

Note: 0.343 is the factor to calculate the SO_2 in $BaSO_4$. 50 c.c. acid are used for analysis; therefore two times the amount of SO_3 in 50 c.c. gives the amount in 100 c.c., which is the per cent SO_2.

CaO as Calcium Suphate

CaO and SO_3 in calcium sulphate are combined in the ratio 56 : 80 = 7 : 10. Therefore the amount or per cent of CaO as calcium sulphate is calculated from the SO_3 by multiplying with 7/10.

SO_2 and CaO Combined as Calcium Monosulphite

SO_2 and CaO as calcium monosulphite, is determined according to Oman:

To 50 c.c. sulphite cooking acid is added with constant stirring drop by drop 15 c.c. 26 per cent ammonia and the precipitate of $CaSO_3$ is allowed to settle for ten minutes. Filter the precipitate and wash three times with 14 per cent ammonia, using 25 c.c. at a time. Wash the precipitate down in a half-liter flask, add 5 c.c. concentrated HCl and fill to the mark. Transfer to a burette and run it against N/16 iodine solution as in the determination of total SO_2.

a = number of c.c. diluted acid solution
b = number of c.c. iodine solution

$$\frac{2 \times b}{a} = \text{per cent } SO_2 \text{ as monosulphite}$$

$$\frac{7 \times 2 \times b}{a} = \text{per cent CaO as calcium monosulphite}$$

Free SO_2

The free SO_2 is calculated by subtraction of the combined SO_2 determined in (4) from the total SO_2 (1).

In order to check the separate determinations of CaO as sulphate and CaO as monosulphite, the total CaO is determined according to the oxalate method. The CaO combined with the organic matter in the acid is neglected, because the amount falls within the error of the analysis.

Total CaO

Twenty c.c. of the reclaimed acid are diluted to 200 c.c. and boiled with HCl until free from SO_2. Add ammonia until alkaline, boil for five minutes, and precipitate the calcium with a boiling solution of ammonium oxalate. Allow the precipitate to settle for four hours, filter, wash, dry ignite and weigh after cooling in a desiccator.

a = weight of CaO

$5 \times a$ = per cent total CaO

Note: When analyzing acids made from limestone one single precipitation is sufficient because the amount of magnesia in the limestone seldom exceeds 1.50 per cent and in the concentration of above the magnesia is not precipitated as oxalate. In case of acids made from milk of lime, the first precipitate of calcium oxalate has to be dissolved and reprecipitated by ammonia, and the magnesia determined in the filtrate as magnesium phosphate.

A series of tests was carried on using this method, during a period of six months June-November, 1921. A wide variation in both the total SO_2 and the SO_3 was noticeable, as shown in the appended table. The acid analyzed was a reclaimed acid made with Jenssen limestone tower acid system. Side relief was used and added to the reclaimed cooking acid; the organic matter present being ca. 0.2 per cent.

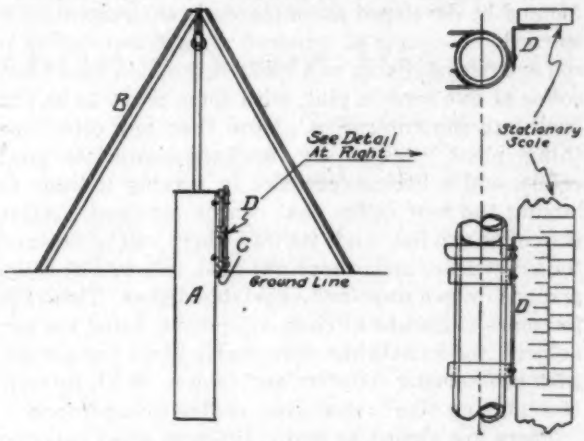
Total SO_2	SO_3	Cao to $CaSO_4$	Oman CaO as $CaSO_3$	Sum	Grav. Ttl. CaO	Difference
3.987	0.132	0.093	1.110	1.203	1.199	+0.3%
3.954	0.137	0.090	1.354	1.444	1.537	—6.0%
4.167	0.135	0.089	1.143	1.232	1.187	+4.0%
4.252	0.135	0.109	1.287	1.396	1.331	+4.9%
5.135	0.112	0.078	1.399	1.477	1.478	—0.6%
5.518	0.091	0.064	1.383	1.477	1.423	+1.7%
5.323	0.130	0.091	1.194	1.285	1.298	—1.0%
5.899	0.089	0.060	1.143	1.203	1.236	—2.6%
5.889	0.070	0.049	1.139	1.188	1.189	—0.1%
5.363	0.087	0.061	1.069	1.130	1.122	+0.7%
6.172	0.052	0.039	0.995	1.034	1.061	—2.5%
5.325	0.085	0.060	1.131	1.191	1.201	—0.8%
4.270	0.042	0.029	0.868	0.897	0.932	—3.7%

7.024	0.058	0.040	0.723	0.763	0.770	—1.0%
6.581	0.076	0.053	1.020	1.074	1.074	—0.1%
	0.065	0.046	1.190	1.236	1.253	—1.4%

The average of differences is plus 2.3% and minus 1.8% respectively, indicating that an individual analysis is good within about 2%.

Volumetric Measurements of Pulp Wood

IN making pulp wood measurements and yield determinations, it is often desired to ascertain the solid contents of a piled cord. The apparatus used for that purpose at the Forest Products Laboratory consists of (A) a galvanized tank set in the ground, with a volume of about 1.75 cubic feet per foot of length; (B) a tripod placed over the tank for raising and lowering the heavier sticks; (C) a glass gauge on the side of the tank, calibrated to read in cubic feet and decimals thereof; and (D) a simple vernier scale attached to the glass gauge to permit closer reading to five thousandths of a cubic foot. Ten divisions on the vernier equal nine divisions on the stationary scale. Graduations on the stationary scale are in tenths and five hundredths of a cubic foot.



Before immersing each stick, the water level in the gauge should be at or slightly above the zero mark. The stick is immersed and held just below the surface of the water by a pointed rod stiff enough to overcome the buoyancy of the largest and driest pieces without bending. One gauge reading is made before and one during the immersion of the stick, the difference giving its volume.

Testing Fibre Board for Strength

THE strength of paper or fiber board varies greatly according to the amount of moisture in it, and this amount is continually changing with the atmospheric conditions. As the relative humidity of the air increases, the strength of fiber board declines very rapidly. A piece of corrugated board tested at the Forest Products Laboratory showed a decrease in strength, by the Mullen test, of 59 per cent when the relative humidity was raised from 65 to 97 per cent.

When fiber boards were subjected to a low, then to a high humidity, and later tested at the low humidity, the results were practically identical with those obtained before the increase in moisture. This proves that the boards had not been injured by the change in humidity, and that variations in the strength of the boards at different humidities are entirely due to a change in moisture content.

The experimental work shows conclusively that when fiber board is bought and sold on strength specifications, the humidity at which the board is to be tested must be stated.

Six Definite Things That Workers Want

5—A Square Meal

By JAMES H. COLLINS

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THEY hired Tony to fire the boiler because he offered to work for low wages. But that very day the power fell off, and the engineer said it was Tony's fault—he didn't keep up steam.

They hired Tony on a basis that is common enough in business, though nobody tried it in a boiler room before. They gave him a perfectly good boiler, and all the tools to work with, but no coal! Tony was supposed to hustle fuel himself, as part of his job, and the reason he couldn't keep up steam and deliver work to engine, shaft and pulley was that he had to spend most of his time hustling kindling wood around the factory yard.

For years they have been hiring Tony for other jobs—laborer, miner, shop hand. What he ate, and where and how he ate it has been considered Tony's own personal affair—until lately. Now it is beginning to be seen that workers are not unlike power plants in that energy must be fed into them before it can be taken out, and that even the best-paid and most intelligent employees do not always know how to fire the human boiler.

Left to himself, Tony would earn his three dollars a day, save ninety cents on the dollar, and live on a loaf of bread and a couple of bananas.

Left to themselves, mechanics eat a cold lunch out of a bucket or paper bag, in the dirt and grease of the shop.

Left to themselves, girl machine operatives often hurry to work in the morning without breakfast be-

cause they are late, and if their morning's output were plotted in a curve it would show just so much energy lacking that hadn't been eaten, and therefore could not be delivered by the half-starving worker.

Many years ago an English manufacturer tried a classic experiment. He had two factories, one in England and the other in France, both making textiles by the same process. English output per worker was just about double that in France. English operatives ate meat freely, while the French workers didn't. He began feeding the roast beef of old England to his French employees, with the result that in a few months their output came up to English standards.

In the same way many American business concerns are learning that the square meal is a factor in working efficiency, and that attention given to seeing that employees get it is well worth while in output, health, contentment and other ways. The plant cafeteria and restaurant is being so widely installed today that a special journal called "Plant-Restaurant Management" is now published in Chicago—it deals entirely with this subject of feeding workers. The paper-bag and tin-bucket meal, eaten cold at a greasy bench, is being replaced with warm meals served at reasonable prices in the company cafeteria. The girl who gets up too late and hurries to the factory without breakfast can eat it there before starting work. The office girl's soda fountain lunch of cake and nut sundae is being replaced by a wholesome dish of meat and vegetables with hot coffee at no more than she spends at the soda fountain, while the bucket of stale coffee half warmed on the radiator is replaced with a pint of fresh coffee for a nickel, piping out, with sugar and milk.

One of the big Wall Street banks has a restaurant for employees, serving four or five meals a day—breakfast, lunch and supper, with extra meals for night workers. In arranging his menus at the outset, the manager provided hearty staples like corn beef and cabbage for the husky porters, and dainty salads for the girls doing light office work. To his surprise, the husky porters would eat the salads, while the office girls cleaned up the corn beef and cabbage. A little investigation showed why. The porters live at home, and get a substantial breakfast and supper, so light refreshment at noon was all they needed. But many of the girls live in furnished rooms, have no way of cooking, and so eat cold things for breakfast and supper. In the company's restaurant they ate their main meal, getting substantial food at prices less than prevail in the kind of restaurants they could patronize.

Some months ago, while an oil tanker was being repaired in a Brooklyn dry dock, an explosion occurred, attributed to an accumulation of gas in one of the vessel's fuel tanks. Four men were killed and twice as many hurt. Had the accident come a half hour earlier, or fifteen minutes later, the casualties might have made it a great disaster. The dry dock company maintains a plant restaurant where the employees go for a clean, wholesome meal at noon. More than one hundred men working on that ship were at lunch when the explosion took place. Without a plant restaurant they would probably have been eating a cold lunch on the ship.

Plant catering runs all the way from the setting aside of space where employees can maintain a coffee urn themselves, to the furnishing of a substantial warm meal at noon free of charge. No work force is too small to benefit by some improvement in feeding. Plant catering may begin with the serving of hot coffee and be developed as employees' requirements are learned. A couple of hundred dollars invested in a coffee urn and dishes will make it possible to sell hot coffee at five cents a pint, with some profit to be put back into the enterprise. More than any other one thing, plant caterers say, workers appreciate good coffee, and a little experience in serving it leads to buying the best coffee that can be obtained. After the coffee urn has made its way, there will be demand for sandwiches and other light food, followed by soup, and one or two meat-and-vegetable dishes. This calls for more elaborate kitchen equipment, hired kitchen helpers, and something more nearly like a restaurant, with self-serving counters and tables. With growth, the catering plan is shaped according to conditions.

There are almost as many different plant catering plans as there are business concerns giving attention to this vital matter of food eaten by employees during the work-day. In many cases, employees volunteer to keep costs within reason. A metalware factory in New Jersey, for example, is able to serve lunch to 750 employees every day at an average of thirty cents by putting service on a volunteer basis. Cooking and dish-washing are done by hired workers, but when lunch is ready in the steam tables, women from the factory and office take turns serving. Even with the self-serve plan, there must be attendants at the counter, a considerable item of expense. Kitchen work, cleaning up after meals, breakage and the purchase of food in smaller quantities than are used by restaurants, are other outstanding items, to be kept within reason by employee teamwork. The space required for a plant restaurant is another expense, very often written off the restaurant account as a contribution by the employer.

There are three different ways of running a plant restaurant. Some concerns lease the privilege to a private operator, furnishing meals and dishes. In other cases the employer furnishes everything but lets an outsider operate the plant on a percentage arrangement. Both these plans add a profit to food, however, so in the majority of cases the plant restaurant is run by a manager working for the company, and food is sold at cost, the restaurant getting its profits in contentment.

Many industrial plants are located where it is diffi-

cult to buy good food. A large percentage of our industrial workers today are of foreign birth or descent. Left to themselves, they follow the European practice of eating small smacks through the day, usually cold, and things containing little nourishment, like fruit. Where warm wholesome food is obtainable at reasonable prices, it increases health, strength and happiness.

Work is simply energy, whether physical or mental. Human energy is food, and nothing more. It may be the muscle energy of the technical worker designing a million-dollar power station. No matter—the human machine will not run without a suitable fuel. That fuel is food, and business concerns in widely diversified lines are learning that it pays to provide it, making certain that quality and quantity are right. Every improvement in the food available to workers on the job is an improvement in the standard of living, and shows up in improved output. To the employer, the square meal is good business—and to the worker it is part of the square meal.

The Power Plant of the Paper Industry

By A. G. DARLING and H. W. ROGERS

Presented at the Seventh Annual Meeting of the Technical Association of the Pulp and Paper Industry, on April 11, 1922, at the Waldorf-Astoria Hotel, New York.

LIKE many other things, the pulp and paper industry is accommodating itself to the change in costs markedly noted since the Great War began. It is not particularly strange that the managers of the mills are calling for more strict economies in the power plant than before. While the power and steam costs are only a small proportion (5 to 11 per cent) of the total cost of product, yet they are well worth investigating, especially since the result tends to reduce the cost of other portions of the process and toward a general increase in efficiency. Of the two primary sources of power in the industry, heat and fall of water, the cost of the former has undergone the more radical change. Fuel has risen some 100 per cent, while kinetic water power has increased only a comparatively small amount.

There is hardly a process in the paper industry that does not require steam in some degree; the result being that each pound of paper necessitates from 4.0 to 6.85 lb. of steam before it is finally shipped.

The mechanical energy necessary to produce the paper from logs as delivered amounts to 0.0437 h. p. per pound of paper.

The Heat Balance in the Paper Mill

The problem then is to combine these two requirements, heat and mechanical energy, in the most economical manner. Where water power is available at a cost lower than the cost of any combination of heat and mechanical energy, it should be utilized to its fullest extent. If there is not sufficient water power for the mill necessitating a supplementary supply from steam, that steam should be used as to obtain the maximum benefit from it.

Modern practice tends toward the use of higher steam temperatures and pressures. It is true that equipment for such costs more but on the other hand the economies from the steam using equipment generally warrant the additional expenditure.

The highest pressure necessary in paper mill processes is used in digesters, usually from 80 to 100 lb. gauge. In the past this has been supplied direct from the boilers, and quite rightly, too, as boiler pressures have not been sufficiently high to develop the energy between them and the digester pressures. With pressures and temperatures of the order of 250 lb. gauge and 200 degrees superheat, however, there is an attractive field of energy which should not be overlooked between boiler and digester pressure.

To neglect the energy between boiler pressure and pressures required for drying, heating and bleaching, is to throw away a fair proportion of the coal pile every day. This has been recognized to a certain extent as is evidenced by the use of non-condensing engines exhausting into the process steam mains. The difficulty found with this arrangement is that the demands for mechanical energy do not always yield the quantity of steam required for process work. Generally there is a feast or a famine. The over supply exhausts to atmosphere or feed water, requiring excess water to condense it—both of which are wasteful, whereas the under supply must be made up from throttled high pressure steam which gives temperatures higher than necessary.

It is not unusual to find steam issuing from the dryer rolls of paper machines, when there is still 80 to 90 per cent of the heat left in the steam and more wasted by having to pump cold water to condense this steam.

A heat balance can be obtained and further maintained by the application of properly designed equipment.

For example let us take the usual boiler plant conditions—steam at 150 lb. gauge practically dry with sufficient condensing water to be used where necessary. In this steam there are the following heat values assuming boiler feed water to be at 200° F:

From 200° F. to 212° F.	12 B. t. u.
From 212° F. water to 212° steam	970 B. t. u.
From 212° steam to 358.5° (150 lbs. Ga.)	223 B. t. u.
	1,205 B. t. u.

It is easily seen that the major portion of the heat is that of evaporation—80.5 per cent. Supposing process steam is used at 20 lb. gauge, there are available 49 B. t. u. (1205 — 1156) of heat. It is worthy of note also that out of 1,156 B. t. u. in 20 lb. gauge steam 84 per cent is available in merely condensing that steam to water which should be done in paper machine dryers and heating systems rather than in the feed water by extra cooling water.

The demands for steam in process are fairly constant for drying and heating though it is not unusual to find paper machine operators shut off their steam valves when a break occurs and opening up rather fast when the paper is again running. If pulpers or bleach boilers are included in the demand the requirements for steam vary rather widely, being of the order of 30 to 50 per cent of the total used in that process. It is this variable demand which requires special attention and will be discussed later.

Let us assume a given mill and discuss the possible means of meeting the demands. For instance, a 100 ton per day mill is a general size and it gets its product from 80 per cent groundwood and 20 per cent sulphite.

The mechanical power requirements will be approximately as follows:

Table I—Mechanical Power Required in Process

Groundwood.	
Wood Room	88 H. P.
Grinder Room	5,613 H. P.
Sulphite.	
Wood Room	100 H. P.
Screens, Pumps, etc.	137 H. P.
Machine Room.	
Beaters, Jordans, Pumps, Machine, etc.	1,475 H.P.
Finishing Room	35 H. P.
Machine Shop	50 H. P.
Super Calenders	1,250 H. P.
Total	8,748 H. P.

To combine all the elements, it may be assumed that sufficient hydro-electric power is available to operate the wood and grinder rooms, the balance of the power coming from steam.

It is further assumed that the drive is as follows:

Alternating-current motors used throughout the mill for power purposes, except on the paper machine, with synchronous motors on the grinders and jordans; the paper machines to be equipped with the direct-current sectional type of drive, with synchronous motor generator set for supplying the power. In this case, low pressure steam will be required for drying.

The steam requirements will be approximately as follows:

Table II—Steam Used in Process

Process	Lbs. steam per lb. paper	Pressure lbs. Gauge	Average lbs. steam per day	Lbs. steam per hr. Avg.	Max.	Min.
Cooking	.6— .75	80—100	135,000	5,630	12,700	3,840
Beating	.6	20	20,000	834	2,000	.....
Drying	3.0—4.75	20	775,000	32,300	40,300	16,000
Heating	.3—1.25	20	155,000	6,450	19,600	.....
Total	4.0—6.75	..	1,085,000	45,214	81,600	19,840

Assuming an average motor efficiency of 84 per cent, distribution loss of 5 per cent and load factor of 38 per cent on the super-calenders and 80 per cent on the balance of the mill, the average load on the generators becomes 5,800 k. w.

The steam requirements for process and heating will vary from about 82,000 lbs. per hour to 20,000 lbs. per hour, according to the time of year and the requirements of process.

There are several ways of furnishing the process and heating steam. Since our boiler pressure is only 150 lbs., and our digester pressure is between 80 and 100 lbs., we will assume that there is not sufficient heat energy available between the boiler and the digester pressure to transfer it into mechanical energy. This leaves available the steam which contains usable energy between 150 and 20 lbs. pressure. The amounts vary from 62,000 lbs. to 16,000 lbs. per hour.

There are various methods of utilizing the energy in this steam before it is passed to the process mains. For the purpose of this discussion only two methods will be mentioned.

Steam turbines are similar to compound engines in the fact that they utilize the steam in stages corresponding to the various pressure cylinders of the engine. Likewise, a turbine can be made to operate condensing non-condensing, and further can be designed to operate condensing while simultaneously emitting steam which retains some of its original energy, having given up the balance to accomplish work in the turbine. This is accomplished by extracting steam after it has passed through the first stage. The remainder of the steam develops its full energy by passing through the subsequent stages on its way to the condenser. As both parts of the turbine depend upon the quantity of steam passing through them for the energy to drive the generator, it is necessary to automatically control the steam to the throttle and the pressure of the steam extracted. This can be accomplished most economically by an internal valve between the first and subsequent stages. As both the electrical load and the extracted steam requirements may vary, a governor is required to regulate the speed of the unit. Here, then, is a device which will produce electrical energy in any quantity up to its limit of capacity and simultaneously utilize the difference in pressure between boiler and process to supply some part of the electrical load, so saving the

necessity of generating high pressure steam to accomplish the equivalent work and an additional amount for throttling to process pressure. It also provides the exact amount of steam required for process, except for a small quantity required to maintain the temperature of the latter stages. It gives constant speed, which is primary in the manufacture of all grades of paper.

Under the conditions assumed, the average amount of process steam will develop approximately 750 k. w. The groundwood and grinder load being supplied from hydro-electric power, there is left a balance of 1,050 k. w. to be generated by steam passing through the entire turbine to the condenser at a very economical rate.

The second scheme—that of non-condensing turbine to develop the energy of the process steam between boiler and process pressure—will also give approximately the same electrical energy. This machine, floated on the hydro-electric generator and the condensing turbo generators, which must be installed to make up the required energy supply, need not have a speed governor, but should have an overspeed safety trip device and a back pressure regulator. It will then give an electrical output in proportion to the amount of process steam passed through it. Its economies will be slightly better than the extraction turbine upon the same steam basis, but in many cases the cost of a non-condensing and a condensing turbine will exceed that of a single extraction turbine to give the same results.

Where some other source of energy is available in sufficient quantities to absorb the fluctuating supply from the process steam going through the non-condensing machine, and where that other energy is less expensive than energy from a condensing turbine, the non-condensing unit should work to considerable advantage.

Either of these schemes include the feature which is most important—a reliable source of electrical energy with automatic control of process steam. Emphasis cannot be laid too strongly on the necessity of using all the heat put into the steam by the boilers. Methods have been developed and used successfully for many years of condensing the process steam in the process so returning only water to the boilers at a temperature most suitable to the boilers for feed water.

The Electric Boiler

A number of paper mills are so fortunately situated that they have excess water power available during portions of the year. With spare generating capacity, this energy has recently found a new market for itself within the paper mill. Excess water power can be substituted for fuel at almost any time and place. Electric boilers are the outlet for excess power.

The efficiency of such boilers can be made 96 per cent, or better. The operating force per b. h. p. is comparatively small. Such equipments have been successfully used in Sweden and other places where hydro-electric power is inexpensive. It requires about 350 k. w. h. to generate 1,000 lbs. of steam. The cost of electricity should be below 8½ mills per k. w. h. in order that a saving be made over coal generation, coal costing $5 per ton. Excess power from hydraulic sources seldom costs such a figure, while coal often reaches $5 per ton.*

The Hydraulic Plant

One of the results of the increased fuel and labor costs is the corresponding increase in water right values. A number of hydraulic plants find it economical to rehabilitate their equipments by tearing out the antiquated machines and putting in modern equipment, which shows an increased efficiency up to 30 per cent, depending upon the age and condition of the old equipment, and also upon the possibility of more complete usage of the power available at the site.

In this connection, a brief reference to the more recent developments in hydraulic apparatus may not be amiss.

There has been a marked increase in the number and total horsepower of water wheels in the past few years which has given the inspiration for improvement in efficiency and increase in size of wheels.

The progress is shown in Table III.

Table III

Date	Maximum Unit Horsepower	Total Horsepower Developed in the U.S.A.
1900	5,000	650,000
1910	18,000	2,900,000
1920	55,000	8,200,000

The progress in efficiency has been correspondingly great, amounting to a gain of some 13 per cent since 1900 at best points, while fractional load efficiencies have been increased to an even greater extent, for example, from 27 to 40 per cent at half load.

Of the more recent improvements in design, perhaps the change in draft tube construction and increase in specific speed has been the most marked. Several of the water-wheel manufacturers have adopted draft designs tending to regain the energy existing at the discharge of the runner.

The claims made are that the increase in specific speed allows an increase in actual speed, so reducing the cost of direct connected generators and giving general economies in space and size of parts. One example of the new application resulted in an increase from 133 to 150 r.p.m. in a 60-ft. head, 11,000 horsepower installation that is now being made.

New and better types of runners for low head plants, prevention of leakage and corrosion around the seal rings, are among the other recent improvements.

Tail water level control has been a subject to which

*For more complete information, see "Electrically Heated Steam Boilers," by E. A. Lof. General Electric Review, Vol. XXIC, page 515. Also paper by Horace Dreer presented at this convention.

a great deal of attention has been given in the past, resulting recently in several schemes which promise more or less relief from loss of head during flood conditions. Nearly all of them attempt to reduce back water by an auxiliary stream to that coming from the runners, forcing the water away from the tail race of the runners. Some add the ejector principle to the power stream by passing an auxiliary stream through the draft tube.

These improvements all tend to increase the rate of depreciation on old machinery, at the same time making it possible to show cause for replacements and hitherto uneconomical developments.

Automatic Hydro-Electric Generators

Perhaps one of the greatest factors entering modern economies is made possible by the elimination of constant attention to hydro-electric and electrical sub-station equipment. We have become accustomed to pushing the button and seeing things happen over which we have no direct control beyond starting and stopping. We have not satisfied ourselves, however, that increased labor costs and decreased results are justified. We know how we want things done and are willing to pay a reasonable amount to see those things accomplished in the manner specified. Your engineers are capable men who can instruct their subordinates, but no human power can guarantee that the result will be what is expected, or when repeated will always give the same result. Machinery, to a large extent, merely accomplishes repeatedly the physical interpretation of some human desire. Parts wear out and need replacement, sometimes get out of adjustment, yet we are able to accomplish many things repeatedly merely with supervision instead of actual operation.

The governor was one of the first automatic devices which made water-wheel and steam-engine operation successful. Relays on electrical circuits are the masters constantly ready to relieve dangerous conditions. Remote control of motors, elevators, oil switches, and so on, has been an accomplished fact for some time. It is, therefore, not a very long step to place similar devices on water wheels, generators, exciters, motor generator sets and rotary converters. In fact, there are now in successful operation—without constant attention—eleven automatic hydro-electric generating stations, besides about as many more on order.

A total of approximately one hundred sub-station equipments are now in operation and about as many more on order. These latter equipments control motor generator sets, rotary converters, and their attendant apparatus.

The pulp and paper industry utilizes an enormous quantity of water power; some sites being conveniently located for attendance, some located some distance away from the mill, and others not being developed because of the high operating expense.

The automatic hydro-electric station offers a means for economical power not heretofore deemed possible. It will develop reliable power with minimum attention. It is accomplished by accurately repeated operations in accordance with schemes developed by men familiar with requirements and equipment. Practically all water-wheel and governor manufacturers have entered the field enthusiastically, with the result that co-ordination between hydraulic and electrical parts has been secured.

Summarizing the power situation in the pulp and paper industry, as well as others, it is not extravagant to say that in the face of the increased costs of materials, labor, and money, the engineers of the present day can and are meeting the problems with a grasp that assures realization of profits.

Sulphur and Sulphur Burners

By H. E. WESTON

Instructor in Pulp and Paper Chemistry, The New York State College of Forestry

SULPHUR is a pale yellow, brittle solid. It is found in nature either free or in combination with other elements.

In the free or uncombined state, sulphur is found in the vicinity of active or extinct volcanoes. While a number of other countries have extensive deposits, some of the most important deposits are in Italy, Sicily, Spain and the United States. The principal sources of sulphur for the North American Continent are the Louisiana and Texas beds, which are located 500 or more feet below the earth's surface. Whereas sulphur found in the vicinity of volcanoes is often mixed with rocky material amounting to about 75% of the entire mass, the sulphur removed from the North American beds is noted for its purity (99.93 to 99.98% pure).

In the combined state, sulphur occurs as hydrogen sulphide in the waters of sulphur springs, or as sulphur dioxide in the air in the vicinity of active volcanoes. It also occurs combined with metals as sulphides and sulphates. Galenite PbS, zinc blende ZnS, copper pyrite $CuFeS_2$ and pyrite FeS_2 are a few of the sulphides, while gypsum $CaSO_4.2H_2O$, ferrous sulphate $FeSO_4$, heavy spar $BaSO_4$ and lead sulphate $PbSO_4$ may be listed as some of the sulphates. Sulphur is also found in small quantities in vegetable

and animal matter in combination with other elements. This source of sulphur is not made use of commercially.

Methods of Extraction

The method of extracting the uncombined sulphur depends upon the condition in which it is found. In general, it may be said that there are two methods of extraction, the Sicilian Method and the French Method.

The Sicilian method is used where the sulphur deposit is in the vicinity of active or extinct volcanoes. The rocky material containing the sulphur is heaped into piles, which are then covered with spent ore. Sufficient air is admitted to the pile to burn a small portion of the sulphur, which produces enough heat to melt the remainder. The molten sulphur sinks down through the pile and runs out at the bottom, into a collecting pool. If this sulphur is to be further purified, it is heated in iron retorts and the sulphur vapor passed into brick chambers where it is condensed and deposited as a fine powder on the cool walls of the chamber. This form of sulphur is known as "flowers of sulphur." As the walls become warm, the sulphur melts and collects on the bottom of the chamber where it is drawn off and cast into sticks. This product is known as "brimstone" or "roll sulphur."

For many years, Sicily controlled the sulphur market of the world, but it has been superseded by the Gulf State deposits. These deposits (in the Gulf States) were located while searching for oil, but due to their depth underground and the hazards of mining, the removal of sulphur appeared impractical. Although several companies failed profitably to extract this sulphur, it remained to the genius of Herman Frasch, an American chemist, to develop a practical method for extracting it. In his process, a hole is drilled and piped down through the overlying deposits to the bottom of the sulphur bed. Two pipes, an 8" and a 6", are placed inside a large pipe casing of the hole for the entire distance. Within the 6" pipe is a 3" pipe which, in turn, surrounds a 1" pipe. Water heated to 167° C. under pressure is forced down the well through the 8" and 6" pipes. The heat of the water is sufficient to melt the sulphur, which is then forced up through the 3" pipe by hot, compressed air entering through the 1" pipe. Strainers are placed at the bottom of the 8" pipe to prevent earthy material from being driven upward. These strainers are made by boring ½" holes 6" apart arranged in spiral form, through the 8" pipe. The melted sulphur, as soon as it reaches the surface, is run into huge bins made of rough lumber where it soon cools and solidifies as an enormous block of practically pure sulphur. This block is broken up by blasting and is then ready for shipment. This sulphur is used very extensively in the manufacture of sulphite cooking liquors.

Chemistry of Sulphur

Sulphur in the form of rhombic crystals melts at 114.5° C. to a thin amber liquid. With further heating, the liquid thickens and turns dark brown, until at about 250° C. it is very nearly black, and so thick and viscous that the vessel containing it may be inverted without the sulphur running out. At about 300° C., it again forms a thin liquid and at 444° C. it boils. It burns readily in air, producing sulphur dioxide gas. It also unites to a certain extent with the oxygen of the air so as to form sulphur trioxide, which is the anhydride of sulphuric acid. Sulphur dioxide is the oxide of most interest to us because it is used in the making of sulphite cooking liquor. It is a colorless gas with a suffocating odor. It has a specific gravity of 2.21 as compared with air. Water at 0° C. will absorb 79.8 times its volume of sulphur dioxide and only 39.4 times its volume at 20° C. Since, in a large way, this varying solubility of sulphur dioxide determines the strength of acid which can be made, it is of great importance in the manufacture of sulphite cooking liquor. Dry sulphur dioxide gas is chemically very inactive, but, when combined with water forming sulphurous acid, it becomes extremely active and will attack and corrode most metals. Lead and its alloys with antimony, however, resist its action almost completely. Alloys of copper also resist the action of sulphurous acid to a considerable extent, and are, therefore, often used as brasses and bronzes in the manufacture of valves, fans, etc., for the acid plant.

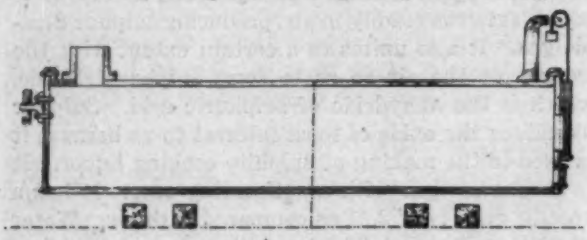
Burned below 400° C. .....Sulphur Forms SO_2
Burned from 400°-800° C. .....Sulphur Forms SO_3
Burned from 800°-1200° C. .....Sulphur Forms SO_3
Burned above 1200° C. .....Sulphur Forms SO_3

Since SO_2 is desired, the burners should be operated at about 1000° C. The dampers should be regulated to admit enough air to form about 15% SO_2 in the burners. To supply 1 lb. of oxygen for the combustion of 1 lb. of S, the quantity of air required is 54 cu. ft. The volume of air required to burn 1 lb. of sulphur to 15% SO_2 gas is 78.9 cu. ft. The relation between percentage by volume of SO_2 gas formed in the burners and the volume of air admitted is shown by the following table:

% by Vol. SO_2	Vol. of air	% SO_2	Vol. of air
4	296.1 cu. ft.	13	91.0 cu. ft.
5	236.8 cu. ft.	14	84.6 cu. ft.
6	197.4 cu. ft.	15	78.9 cu. ft.
7	169.2 cu. ft.	16	74.0 cu. ft.
8	148.0 cu. ft.	17	69.7 cu. ft.
9	131.6 cu. ft.	18	65.8 cu. ft.
10	118.4 cu. ft.	19	62.3 cu. ft.
11	107.7 cu. ft.	20	59.2 cu. ft.
12	98.7 cu. ft.		

Specially devised burners are used to convert the sulphur into sulphur dioxide gas, SO_2. The ideal burner would quantitatively convert sulphur into

SO_2. This condition is not easily reached in practice. Many factors tend to lower the efficiency of the burner. Incomplete combustion causing sublimation, and the conversion of SO_2 into SO_3 are two of the sulphur losses caused by improper oxidation. For this reason the volume of air admitted to the burners is of greatest importance and the burning of sulphur is, therefore, an operation requiring careful regulation. It has been essential to develop equipment which would, as far as possible, fulfill these necessary conditions of burning.



Courtesy Stebbins Engineering and Manufacturing Co.

Figure 1—Longitudinal Section of Flat Type Sulphur Burner

The general types of sulphur burners in industrial use are the flat, the rotary, and the vertical.

Flat Burner

Probably the oldest type of burner is the flat burner, which is usually made from a single casting of cast iron, and built low. The cross-section is semi-circular or D-shaped. Because of their size, approximately 10 feet long, 2 feet wide, and 18 inches deep, several of them have to be used to supply enough SO_2 for a large plant. They are either set up in banks on a brick foundation or upon rollers which allow for the expansion and contraction of the burner. The pipe by which the gas leaves the furnace is either bolted to the back of the furnace as high as possible above the pan or else to the top of the arch near the end. Figures No. 1 and 2 show a longitudinal section and a cross-section of a typical flat burner.

The burner is supplied with a door which is used for furnishing the sulphur, and also as a regulation of the air supply through a damper located in it. This piece of equipment requires very close supervision to produce a satisfactory gas, as SO_3 is very easily formed. Sublimation, caused by inadequate air supply, often takes place, thus decreasing the efficiency of the burner.

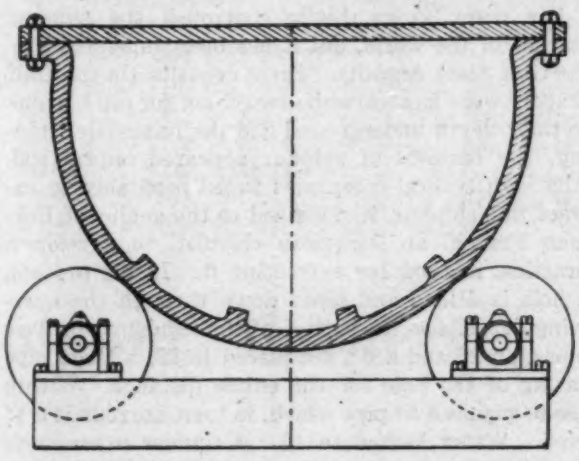
This system of burning has many disadvantages, the most important of which are:

1. Small capacity—requiring too much floor space for a good sized installation.
2. Difficulty of control since sublimation and the formation of SO_3 take place too readily.
3. Necessity of frequent cleaning causing loss of time and waste of sulphur due to incomplete burning. This frequent cleaning is due to the deadening of the fire by impurities in the sulphur remaining on its surface during the combustion.

A few notes given by Mr. Floyd Hunkins, in regard to an installation of flat burners as operated in an old New York State mill, no longer existent, may be of historical interest. The system was apparently known as the "Pressure System." The flat burner was reported to have been completely submerged in water contained in a tank in which the burner was placed. Pipes for water inlet and overflow were properly arranged in the tank. Melted sulphur was fed to the burner through a pipe which extended to within 3" of the bottom on the inside of the burner. Air, furnished by an air compressor, was delivered to the burner through an air duct. A peep hole was arranged in the burner so that the burning could be watched from above the water level. This system, as far as is known, was the only installation of its kind in this country. Much care and thought were required on the part of the burner-man for successful operation. Gas containing 12 to 14% SO_2 was made. Too much heat caused sublimation. The necessary cleaning operation of the burner was very difficult. The water was drained from the tank, and a small plate was removed from the bottom of the burner through which all of the ash was removed.

Rotary Burner

The disadvantages of the previously described system have caused it to be largely replaced by more efficient types of burners—either rotary or vertical.



Courtesy Stebbins Engineering and Manufacturing Co.

Figure 2—Cross-section of Flat Type Sulphur Burner

The rotary burner, which is perhaps the most extensively used burner on the market today, is usually constructed of ¼" plate steel. Flanges are placed at either end and also in the middle of the burner. These flanges are machined so as to run on suitable trunnions. The ends of the shell are conical. The front end is equipped with a door for feeding the sulphur into the burner by hand or by a mechanical contrivance, and also for regulating the air.

The bases are usually of cast iron and are mounted upon brick or concrete. Two steel trunnion shafts

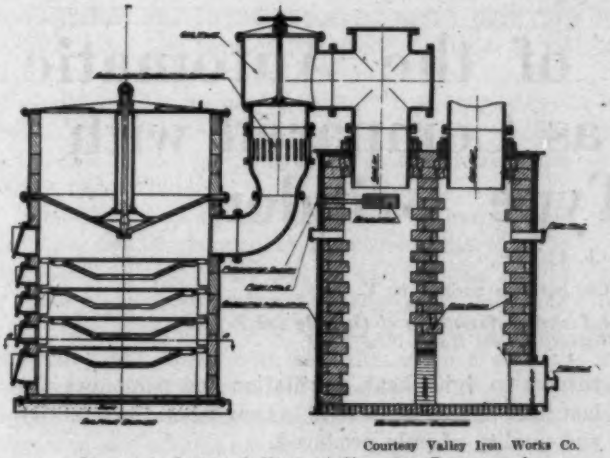
are attached to the bases. The shell revolves on rollers which are suitably placed on the trunnion shafts. These trunnions permit expansion of the shell and also hold it in position.

The driving arrangement may be with chain or gears. The gear drive seems to be the most popular. When it is directly connected to an electric motor, a worm reducing gear drive is usually employed for reducing the speed of the burner.

Hoppers and mechanical feeds of various types have been designed to overcome some of the difficulties present in the old system of hand-feeding through the door. The hopper itself is usually fed either by hand or by a mechanical contrivance, and by these means a constant supply of sulphur is fed to the burner. Dampers are attached to the hopper so that air may be admitted and that burning may be observed. In some cases an additional door with dampers is placed on the burner so that it may be used in place of the mechanical feeder.

The capacity of any burner depends almost entirely upon the draft maintained. The size of rotary sulphur burners in common use ranges from 14″ in diameter and 30″ long (with a capacity of 15 pounds of sulphur per hour), to 48″ in diameter and 20′ long (with a capacity of 900 pounds of sulphur per hour). Ratio Diam. Length 1 15 1 15.42 1 12.53 1 21

The floor space required for a rotary burner varies



Courtesy Valley Iron Works Co.

Figure 4—Sectional View of Vesuvius Burner and Combustion Chamber

directly with its capacity. The 14″-30″ long rotary requires a floor space of 3′ 6″ by 8′ 6″, while the 48″ diameter shell 20′ long requires 11′ by 37′ 6″.

The burner is then properly connected with a combustion chamber so that complete combustion of the sulphur takes place. The chamber is usually made of cast iron in the form of a box or a closed circular steel tank lined with fire brick. A larger combustion chamber than is usually specified by the maker will increase the capacity of the burner.

In order to get the best results with a rotary burner it is advisable to use pure American sulphur (which contains 99.6% to 99.9% sulphur). This will leave only a very small amount of residual material which is usually carried forward with the burner gases and deposited on the floor through an open space in the combustion chamber. It is a wise plan to carry the molten sulphur in the burner at an elevation which very nearly reaches the level of the door. The revolving of the burner causes a part of the sulphur to

Figure 3—Typical Installation of Rotary Sulphur Burners Showing Hand-feed Sulphur Hoppers and Combustion Chamber

be carried over. This acts as a protective coating on the inside of the shell.

It is necessary to have proper regulation of the dampers to insure complete combustion. The concentration of the gas (i. e., percent SO_2 in the gaseous mixture) may be controlled by regulation of these dampers. The concentrations vary from 5 to 17%.

The speed of the rotary is from ½ to 1 R.P.M. Very little H.P. is required. One-half H. P. will usually handle a 36″ diameter shell. A typical installation of this type of burner is shown in Figure No. 3.

Vertical Burner

The third type of burner, the round vertical, is ordinarily larger than either the flat or rotary burner. The best known burner of this type is the "Vesuvius Sulphur Burner." It is constructed of $\frac{1}{16}$″ sheet steel and is set up with heat-resisting brick lining consisting of an inside fire-brick wall laid in mortar composed of common brick moulding clay and black molasses. The top of the burner is provided with a melting chamber with a needle-valve screw apparatus for regulating the continuous flow of molten sulphur into the burner proper. The inside of the burner is provided with four cast iron dish-shaped trays arranged one above the other as shown in Figure No. 4. A door for regulating the draft and also for cleaning purposes is located at each tray and also at the bottom compartment. The dish-shaped trays retain a great amount of burning sulphur which gives a clean fast-burning fire. They have many advantages over flat trays in that they retain a great amount of liquid sulphur which overflows and deposits the lighter impurities in the bottom compartment of the burner. Heavier impurities settle largely to the bottom of the various trays so that a clean,

bright fire can always be maintained. This heavier material is removed by flushing which is accomplished by filling up the melting pot with sulphur and then slowing up on the feed until all of the sulphur in the pot is melted and the lowest chamber is nearly empty. As soon as this condition is reached, the needle-valve is opened wide and the sulphur will come down with a rush thus carrying the impurities down to the bottom chamber.

The gas outlet consists of an oblong 45° elbow extending about 4½" into the burner, and this extension forms an arch for the brick lining; and a round iron pipe oblong-shaped at one end to conform with the shape of the 45° elbow. The upper end of this pipe is slotted. Around this slotted pipe, resting on a projecting ring, is a circular damper which regulates the final air inlet.

The capacity of Vesuvius burners varies according to size from 250 pounds to 12 tons per 24 hours. Each burner requires less floor space than the ordinary type of rotary burner—the nine-ton burner requiring only 36 square feet.

In operation the burner requires no power. The sulphur is placed in the melting pot at the top of the furnace and a fire started with a little oiled waste on the uppermost tray of the series. The needle-point valve in the bottom of the melting pot is opened slightly, releasing the molten sulphur, which begins to burn. Gradually the valve can be opened wider and wider until the best combustion of the sulphur takes place.

Control of the air supply in this type of burner is a simple matter. No instruments are necessary. The operator only has to watch the color of the flame. A blue flame shows the right amount of air present.

Manufacturers claim that it is possible to burn any kind of sulphur with this burner. Dirty and inferior quality of sulphur is no hindrance to its successful operation. It should be cleaned about once every two weeks; this requires only about two hours of time.

Plant Helps

It is essential that plant operation should not be delayed by a shortage of sulphur. A liberal supply should always be on hand. The storage bins may be made of wood, concrete, or metal. It is usually better practice to have a number of bins of moderate capacity than to have one huge bin. The smaller bins decrease the fire hazard and at the same time make it easier to take inventory periodically. An accurate check on the amount of sulphur in the bins, and the amount supplied to the burners, should be maintained at all times. Sometimes hands are painted on the bins indicating the amount of sulphur in tons that are on hand at any particular time. Such a system aids in increasing the efficiency of the plant.

Relative Efficiency of the Automatic Magazine Grinder as Compared with the Pocket Type Grinder

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Presented at the Seventh Annual Meeting of the Technical Association of the Pulp and Paper Industry, on April 11, 1922, at the Waldorf-Astoria Hotel, New York.

IN THE consideration of the subject of the economic efficiency of the two types of wood pulp grinders, the writer has endeavored to be as brief as possible. However, in order to make the subject plain to those interested, it has been necessary to make detailed explanations of some points for those who are not familiar with the construction and operation of the magazine type grinder.

By relative efficiency, we mean a comparison of the two types of machines with regard to results obtained by each type relative to costs of labor, power, and maintenance charges.

In comparison of either type of grinder we must consider, as a base from which to derive our results, an installation which is modern in every way; that is, the grinders in good condition, wheels developing their rated power, working conditions normal in respect to light, heat, ventilation and personnel, the last item having considerable bearing on the quantity and quality of pulp produced.

In order to avoid repetition and confusion, we will subdivide our comparison into separate items, each of which will be considered separately. These items will be as follows:

1—Construction and operation of:
- (a) Pocket type grinder.
- (b) Magazine type grinder.

2—Production.

3—Labor.
- (a) Labor costs.
- (b) Personnel.

4—Maintenance.

5—Installations.

6—General equipment.

Construction and Operation

(a) Most manufacturers are so familiar with the pocket type of grinder that no description of its construction and operation is needed. However, we may emphasize that the duties of the grinder operator consist in filling the pockets in such a manner that the maximum amount of wood will be used, turning on the grinding pressure, reversing the press plate after the wood is ground and again refilling the empty pockets.

In many cases one man attends to two grinders, if they are of the small type. However, if maximum production is required and the machines have sufficient power delivered to them, one man is required to operate each grinder.

(b) The construction and operation of the magazine grinder is not generally understood by the manufacturers, therefore will require some details regarding it.

The automatic magazine grinder is a machine of considerable size, and its details of construction, especially of the automatic device for charging the pockets, are worthy of special consideration.

The grinder proper consists of a heavy central framework in which the stone, 54" face x 62" to 67" in diameter is hung. On either side or diametrically opposite and formed by the side walls and bottom plates, are two pockets in which are placed two heavy press plates, one for each pocket, which push the wood against the face of the stone. These press plates are operated toward and away from the face of the stone by means of heavily constructed hydraulic cylinders and pistons, and in a manner similar to the raising and lowering of the press plates in the pocket type grinder.

Immediately above the pockets on either side of the stone are the magazines for storing the wood to be ground. These magazines are tall box-like affairs of plate steel construction, 54" wide x 60" long and from 16 to 25 ft. in height. Being of plate construction and when fitted with an exhaust hood on top, they are able to use the steam generated by the grinding process to partially steam the wood stored in the magazine and at the same time remove this steam from the grinder room. These magazines are placed on hinges secured to the floor above the grinding room, so that they may be swung aside when the stone needs to be removed.

Between the magazines and on the upper side of the center frames is a stone dresser, operated by means of hydraulic pressure through a cylinder and piston. The motion of the carriage which holds the burr and its adjusting arrangement, is propelled backward and forward across the face of the stone by the operator through the manipulation of a simple plug valve.

Close to each hydraulic cylinder and connecting to the valve which governs the pressures admitted to the hydraulic cylinders, are the automatic reversing devices which in turn operate the pressure regulating valve.

In regard to the operation of these machines, there is, first, the operating or grinding floor, where one man is required to dress the stones, oil the machinery and observe its operation, and second, the charging floor, where the magazines are filled. Wood can be brought into this room by conveyor and dumped into the magazine, or it can be carried by overhead trolley and cradle and placed directly in the magazines.

In either instance a man is required to see that the wood does not fall crossways or become wedged.

The man on the grinding floor will be able to attend to four grinders without any trouble whatever, while one man to two grinders on the charging floor would be a good average. This is the full extent to which labor enters into the operation of the magazine grinder, as the charging and reversing of the pockets and pressure governing is taken care of by the automatic reversing devices.

Production—Power Requirement

In regard to power per ton of pulp produced, it is a well established fact that a certain pressure in pounds per square inch area of the grinding surface of the stone is positively required to make groundwood pulp. This pressure varies with the grade of pulp being made and the type of burr or stone dresser used.

With the above conditions being considered as constant for a given grade of pulp, there are, in addition, a number of other factors which must be taken into consideration when computing the horsepower required per ton of pulp. These items are: (a) condition of wood to be ground, (b) friction load on grinder bearings, (c) efficiency of power unit, (d) peripheral speed of stone.

Averaging the above conditions and quality of pulps, we find that an average of 65 horsepower per ton will be required to grind one ton of pulp under normal conditions. Any method which will assist in the partial elimination of any of the varying conditions stated above, will of course tend to reduce the power consumed.

In the pocket type grinder the bearings have to carry the dead weight of the stone, flanges and shaft, and, in addition to this, they have also to support the resultant pressure or load resulting from the grinding pressure in the hydraulic cylinders. The net result is that the friction on the bearings is high and needs considerable power to overcome it.

In the case of the magazine grinder, the pockets are situated 180 degrees apart and have a tendency to counterbalance the weight of the stone, flanges and shaft, with the result that the bearing friction is low. A real proof of this is found in Mr. Argy's recent address at the superintendents' meeting at Watertown, N. Y., wherein he states that the magazine grinders installed at the mill of the Cliff Paper

Co., Niagara Falls, in 1913, are yet running in their original bearings, the oil grooves of which have never been chipped out and are yet deep enough to give a sufficient supply of oil to the bearings.

Another condition which helps to produce maximum tonnage per horsepower is the elimination of lost time in charging the grinder pockets.

In the use of the automatic reversing devices on the magazine grinder, we have a cycle of operations based on an interval of five minutes' time. This cycle and its time requirements are as follows: Considering the press plate at the end of its grinding stroke, where it operates a trip for reversing, we have:

(a) Reversing of press plate—5 seconds.
(b) Pause to let wood fall into place—5 seconds.
(c) Low pressure advance—to pack wood tightly in front of plate—5 seconds.
(d) Grinding stroke, high pressure—4 minutes 45 seconds.

This gives an actual loss of grinding time of 3 minutes per hour, or 5 per cent of total grinding time.

In the pocket type grinder we find the loss of grinding time in filling the pockets to be considerably greater, due to the fact that considerable time is lost in sorting the wood to get a full pocket, and even then the pocket is not often more than 75 per cent filled.

Another item greatly affecting production is effective grinding surface of the stone, or area exposed by the pockets for grinding. In the 3 pocket 24" grinder, this area is: $15" \times 24" \times 3 = 1{,}080$ square inches.

In the 4 pocket 24" grinder, this area is: $15" \times 24" \times 4 = 1{,}440$ square inches.

In the magazine grinder, the grinding area is: $48" \times 32" \times 2 = 3{,}072$ square inches.

This gives us nearly 300 per cent more grinding area as compared with the 3 pocket 24" grinder, and nearly 225 per cent more area than in the 4 pocket 24" grinder.

Another advantage of the magazine grinder is the partial steaming of the wood in the magazine before grinding, as this aids materially in production by loosening the fibre to a considerable extent from the pitch and binder which holds it. As the grinding process consists in the loosening of the wood fibre, partly by the heat generated by the stone and partly by the cutting effect of the grains of quartz composing the stone, any process which assists in either direction assists in the other. In many instances it has been found to be an added advantage to steam the wood before grinding it, but the use of the magazine gives this added advantage without additional expense.

While the above cited conditions do not actually reduce the power required to operate the grinder, they do reduce the horsepower consumed per ton by using all of the available power for production, due to small loss of grinding time and increased grinding surface. Actual results obtained from users of this type of grinder show power requirements of from 54 h. p. to 70 h. p. per ton, depending on the grade of pulp ground.

Labor

The third item for consideration is labor, subdivided into labor costs and personnel.

(a) Labor costs or charges can best be shown by a simple comparison of a mill, for example, of 40 tons capacity per 24 hours.

With the pocket type grinder there would be required at least four, probably five, four pocket 24" grinders. The labor required for such a mill would be:

4—men to operate grinders.
2—men to deliver wood to operators and handy men.
1—man oiler and helper, also to re-saw to 2-foot lengths.
1—foreman.

Total 8—men per tour for 3 tours—24 hrs. = 192 hrs. at an average wage of 50 cents per hr. = $96.

$$\frac{\$96}{40 \text{ tons}} = \$2.40 \text{ labor cost per ton.}$$

Using the magazine grinder for the same size of mill would require two grinders of twenty tons minimum capacity. The labor requirement would be:

1—man on grinding floor who would act as foreman.
1—man for oiling for 3-8 hr. tours, and helper for 2-10 hr. tours.
1—man on charging floor for 2-10 hr. tours.

Total 3—men for 64 hrs. at an average wage of 50 cents per hr. = $32.

$$\frac{\$32}{40 \text{ tons}} = 80 \text{ cents labor cost per ton.}$$

Cost per ton pocket type grinder	$2.40
Cost per ton magazine type grinder	.80
Difference in cost per ton	$1.60

As the size or tonnage of the mill increased, the labor cost shows up to still greater advantage in favor of the magazine type grinder.

(b) In regard to personnel, there are a number of items which may seem a little out of place in this subject. However, they have a direct bearing on the efficiency of operation of any plant of this kind.

A man who really understands pulp grinding should deserve favorable notice. It requires considerable experience and observation on the part of the operator to know what grade of pulp he is produc-

ing and how to quickly remedy such faults as occur daily.

As a rule the grinder tender has a job which is not incentive to much effort on his part except to get away as soon as possible after his time is up for the day. Usually the grinder room is wet, slippery and full of steam and the job of feeding the grinder is about as monotonous as can be found. Such conditions are favorable to rapid turnover of employees which is always costly, as inexperienced men cannot get results.

Another item is the tendency of average labor to let the pockets run empty, half fill them, quit work at the slightest provocation and in general let things slide as easily as possible.

The use of the magazine grinder eliminates all such conditions, as the grinder room is clean, dry, well lighted and free from steam and can be well heated and ventilated.

The operator on the grinding floor should be a first class mechanic who understands pulp grinding thoroughly, for the entire production of the grinders is up to him. The men on the charging floor need only be common labor, as no skill whatever is needed in their line.

The magazine grinder runs 24 hours a day, with no arguments and no strikes and the men required to tend it have plenty of time to do their work thoroughly. As a rule the operators of these machines take great pride in them, as the machine itself is incentive of good workmanship and neatness.

In regard to maintenance, the construction of the magazine grinder is of necessity unusually heavy to withstand sudden heavy loads such as, for instance, when a log rolls or a stick breaks or crushes. As a result of this heavy design, the necessity for repairs and replacements is reduced to a minimum. Parts that are subject to unusual wear such as adjusting plates against the face of the stone, are made of cast steel and are quickly and easily renewed at small expense. The press plates which hold the wood against the stone are also fitted with easily renewable bronze wearing strips.

Of course the steel shaft and stone flanges are subject to corrosion, but on account of their great bulk and their design they are easily able to withstand from eight to ten years' use before being replaced.

Considering the almost constant operation of these machines the cost of repairs is unusually low, a good average being one per cent of the cost of the machine.

The stones used for these machines are of course of unusually large size, but with proper seasoning and correct treatment they will last from 15 months to 18 months.

Installations of the two types of grinders are similar in that they may be direct connected either to water wheels or electric motors. The auxiliary requirements, that is, double pressure pumps, electrical or speed governors, showers, etc., are practically the same except of course on a larger scale.

With a capacity above 40 tons daily production, there is considerable saving in floor space and foundation work of the magazine grinder over the pocket type.

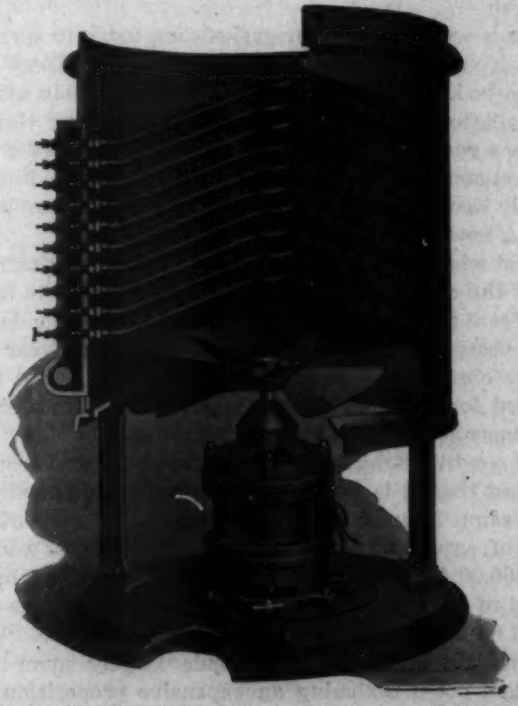
Economical Advantages

From the above comparison, it will be seen that the economical advantages to be derived by the operation of the automatic magazine type grinder when compared with the pocket type grinder can be totaled up as follows:

(a) Maximum production per horsepower consumed.
(b) Lower labor cost per ton of pulp.
(c) Partial steaming of wood at no additional expense.
(d) Low cost of maintenance and repairs.
(e) Use of 4 ft. wood eliminating at least one re-sawing operation.
(f) Cleanliness of grinder room.
(g) Elimination of considerable labor difficulties.
(h) Use of wood up to 30″ diameter.
(i) Saving in floor area and foundation work.

Complete Heating and Ventilating Unit

AN indirect heater with a fan in connection for distributing the warmed air when placed within a room, taking the air from the room and using it over



and over is shown in the accompanying illustration. It can be installed for less than direct radiation and

operated and maintained at less than a direct system. When used as a heating and ventilating unit, taking air from out of doors, it can be installed better than a direct system and the cost of operation is little if any more than a direct system.

This device is peculiarly adapted for heating garages, dye houses and small industrial buildings of all kinds. It is peculiarly adapted to such industrial buildings as are divided into rooms by fire walls, as it can be installed without cutting the fire walls, or floors, thus lessening the fire hazard and insurance rate.

Pointers for the Engineer

By W. F. SCHAPHORST, M. E.

How Much Does a Poor Gasket Cost?

THE WRITER feels that gaskets have not been given enough consideration by most engineers or users of gaskets in paper mills.

In line with Kipling's famous poem, most of us are apt to think to ourselves: "Oh, a gasket is only a gasket, but a good cigar is a smoke," and we let it go at that. Gaskets look so simple and trivial that we don't like to bother our minds with them.

However, when one stops long enough to concentrate on gaskets and think about the important role they play in the paper mill and piping world, in carrying steam, water, all kinds of gases and liquids, low and high pressure, and when we stop to do a little figuring on the subject, it becomes perfectly plain that a poor gasket may be a decidedly expensive piece of equipment and that a first class gasket may be a great money saver. A money saver is a money maker.

As is well known, poor gaskets are liable to spring a leak very soon after they are installed. Some of them leak all the time, beginning immediately after installation. In other words, they are never tight. Take a gasket of this latter kind. If its function is to seal steam pipes carrying high pressure steam, it can easily lose enough steam in one day to more than pay for a new gasket.

Not wishing to exaggerate, however, let us assume that the cost of the gasket is 50c and that the loss of steam per day is 10c. Assuming 300 working days per year, the cost of leakage of steam per year is therefore $30.00. And if the leaky gasket is not replaced for 15 years the total loss during the period becomes $450.00.

If conditions by the end of the first year become so bad that it is decided to put in a new gasket of the same inferior quality every year at a renewal cost of, say, $4.00 per change for labor, the cost would be $60.00 for the labor and $7.50 for 15 gaskets, or a total of $67.50. This added to the $450.00 gives us $517.00 as the total cost of a poor 50c gasket.

The cost of labor also depends largely upon the gasket, often becoming an expensive proposition if the gasket should happen to stick to the flange. In some instances sticking has necessitated taking down entire sections of pipe so that the flanges could be properly cleaned. Again, every engineer and pipe fitter has experienced a great deal of trouble in having screws twisted off and bolts stripped by using gaskets that require enormous pressures before they actually become tight.

Clearly it pays to invest $1.00 in a GOOD gasket rather than 50c if the dollar gasket will prevent leakage and will stay tight for a long period of time.

Sometimes gaskets blow out altogether, or are ruined by super-heated steam, and as a result actually cause plant shut-downs holding up hundreds or thousands of employees at a tremendous expense to the owners. Thus, such a loss might occur at the end of the above 15 years period here and the loss might amount to as much as $500.00 or $1000.00. This loss would have to be added to the above $517.50—almost unbelievable, yet it is possible, and probably is occurring in some plants RIGHT NOW.

What Does Volumetric Efficiency Mean?

THE meaning of volumetric efficiency is best explained by using a reciprocating boiler feed pump as example. Such pumps are frequently used in paper mill boiler plants.

Let us assume that the area of the end of the plunger in this pump is exactly one square foot and that the length of stroke of the plunger is exactly one foot. Then, on the "pushing stroke," it is plain that this plunger should push out exactly one cubic foot of water per stroke and in 100 strokes the quantity should be 100 cu. ft.

However, on measuring the amount of water pumped by a reciprocating pump it is invariably found that there is a shortage. Thus, it might be discovered after measuring the water pumped by 100 strokes that the quantity is actually only 97 cu. ft. instead of the theoretical 100 cu. ft.

The "volumetric efficiency" of this pump, therefore, is 97 per cent. In other words, volumetric efficiency is equal to the volume actually discharged in one minute divided by the plunger displacement in one minute. Or, it is the actual volume divided by the theoretical volume.

For steam driven reciprocating pumps the volu-

metric efficiency is usually assumed to be 85 to 90 per cent if the pump is in reasonably good working condition.

When selecting a pump, therefore, it is important that volumetric efficiency be considered. Capacities as given in manufacturers catalogs do not take into account the losses due to valve leakage, piston leakage, etc. These leakages are inevitable. Even the best pumps, when new, have a volumetric efficiency of 95 to 97 per cent.

Air compressors, ammonia compressors, etc., which are really "pumps," also have a "volumetric efficiency." The same is true of a gas engine on its suction and compression stroke.

Making a Pipe Flow Formula Easier to Use

NO DOUBT, most of the readers of THE PAPER INDUSTRY who have had to compute water pipe sizes know that a commonly accepted formula for computing the friction loss of water in pipes is

$$h = \frac{0.38\ V^{1.86}}{d^{1.25}}$$

Where h=the loss in head in ft. per 1,000 ft. of pipe;
v=velocity of water in ft. per second;
d=diameter of pipe in ft.

This formula is a good one but at the same time it is rather difficult to use on account of the exponents 1.86 and 1.25. What is even worse, however, is the fact that the pipe diameter is given in "feet" rather than in inches. Most of us have trouble enough with plain logarithms let alone co-logs and other complications. So, to compute a one-inch pipe we first have to convert the inches to feet, which is usually less than one, and to find the logarithm of a number less than one is apt to confuse.

The writer has therefore converted the formula into a more usable form as follows:

$$h = \frac{8.47\ V^{1.86}}{d^{1.25}}$$

where two factors are the same as named above with the exception that d=diameter of pipe in inches.

Shall We Make Our Own Repair Parts?

IT IS usually a mistake for any man, even if he is an expert mechanic, to attempt to make his own repair parts, excepting in an emergency, and then the repair part should be used only temporarily.

Take an actual example: A spindle in a control valve leaked. In trying to repair it, the engineer broke the spindle. It looked like a simple lathe job and so he decided to do the work himself, and he made a new spindle out of an old piece of mill-steel rod that had been lying around the plant. It took him six hours to make the spindle. Figuring the value of his time at one dollar per hour, the job cost $6. While he was making the spindle, other work of more importance was neglected. There were miscellaneous fuel and lubricant losses due to neglect that amounted, possibly, to another $6.

After installing the new spindle the engineer found that his work was not accurate, that the spindle leaked worse than before and that he should have made it out of bronze instead of mild steel. He decided to have a new one made and sent the old spindle to a machinist and asked for an estimate on a duplicate part like the old one was before it broke. The machinist quoted $10.

After installing this second spindle, leakage still occurred. The machinist claimed that the original spindle sent him was badly worn in addition to being broken, and that he had been told to "make the new one exactly the same size as the old one," which he did. The cost of the repair now amounted to $22 and still the job was unsatisfactory.

The engineer then looked over his repair-parts catalog (the thing he should have done in the first place), and found that he could get a new spindle for 75c. He telegraphed for it and received it the next morning by special-delivery insured parcel post at a cost of $2.50 including the cost of telegraphing, postage, insurance, etc. The total cost therefore was $24.50, whereas it should have been only $2.50. When the new spindle was installed, the leaking stopped.

Machine parts may appear to be simple, but they are made with remarkable precision in quantity-production turret and grinding machines at a cost that is usually insignificant compared with that of hand labor. The machine work is so refined and specialized that exact duplication is possible only after making the most painstaking measurements with micrometer measuring instruments.

The Economy of Damper Regulators

EVER since steam boilers have come into general use the value of automatically controlling the rate of combustion has been realized. This, usually, is accomplished by means of the steam pressure, high steam pressure closing the damper and low steam pressure opening the damper, thus maintaining a practically constant pressure.

Damper regulators have been steadily improved since the day they were first brought out. The United States Patent Office records show that the first damper regulator patent was allowed in 1847. Today it is doubtful if any other automatic steam appliance has reached a higher degree of perfection.

Years of actual practice have proven that there is only one way to control boiler pressure and that is

by controlling the rate of combustion. That is, the heat of the fire can be controlled by giving the fuel the amount of oxygen it needs to produce the desired amount of heat.

In the first place the air supply to the fuel must be correctly proportioned. The major portion of the air must pass through the fuel bed itself. This is known as the primary air. A second supply, known as "secondary air" is fed above the grade into the flames to make combustion complete. It is practically impossible to bring about complete combustion through the fuel bed alone. By thus correctly proportioning the air there will be no Carbon Monoxide (which always indicate incomplete combustion) and able percentage of Carbon Dioxide.

there will simultaneously be the maximum obtain-

Investing in a first class damper regulator is almost invariably worth while. It will quickly pay for itself.

Advantages of Small Steam Pipe Lines

THERE is such a thing as making steam pipe lines too large in spite of the advantages of accompanying low steam velocity and slight pressure loss. The trick is to select pipes of the RIGHT size—neither too large nor too small.

The size of a steam pipe is usually based on steam velocity. For saturated steam 6,000 to 8,000 ft. per minute is common practice while for super-heated steam 8,000 to 12,000. Before going above 8,000 ft. per minute, however, one should be certain that the piping and valves are of sufficient size and design so that the pressure drop will not be excessive, so that there will be no wire drawing through valves, and no loud whistling noises. By exercising judgment, velocities can sometimes be brought up to 14,000 ft. per minute for large reciprocating engines or steam turbines. It is actually done, sometimes, at 21,000 ft. per minute.

The advantages of small piping are:

(1) Lower first cost. The pipe weighs less per foot. Thinner pipe can be used to withstand the same pressure. Consequently the initial investment is less.

(2) Smaller and less expensive fittings.

(3) Less surface is exposed to the atmosphere, hence the radiation losses are lower.

(4) Less insulation is required because of the small surface—sometimes a very important item.

(5) The greater friction loss tends to super-heat the steam. As a result the steam may reach the engine or turbine, after a long run, in a perfectly dry condition. The pressure loss is thus converted over into useful heat energy.

It has been suggested—and the suggestion seems to have merit—that in long straight runs of steam pipe large valves be used, with smaller intermediate pipe. In this way the steam velocity through the valves would be low, or "just right," and through the smooth pipe the velocity would be high, or, again, "just right."

Producing Bleach Liquor with Liquid Chlorine in the Pulp or Paper Mill

By S. W. JACOBS and H. P. WELLS
Electro Bleaching Gas Company

Presented at the Seventh Annual Meeting of the Technical Association of the Pulp and Paper Industry, on April 13, 1922, at the Waldorf-Astoria Hotel, New York.

MOST of the early work in the pulp and paper industry looking toward the use of Liquid Chlorine was done, not so much with the idea of economy, but with the hope of improving the general practice of bleach making and an unsightly portion of the mill.

It was not until the large production of Liquid Chlorine for war purposes came into being that there was any hope of direct economy due to Liquid Chlorine supplanting dry bleach.

The laboratory work was initiated in the very early days of the Liquid Chlorine industry when the Electro Bleaching Gas Company installed a small beater in which all sorts of paper-making fibre were worked over and bleached. It soon became evident that rags responded very quickly to an acid bleach made by merely dissolving the chlorine in water and running the solution to the beater. In order to make this solution it is necessary to have some control apparatus.

The first of these were made by this company, and installed at the Keystone Paper Company at Upper Darby, Pa., and the Kalamazoo Vegetable Parchment Company at Kalamazoo, Mich., in 1916. Nothing more had been done along these lines until early in 1919 and during this interval the Electro Bleaching Gas Company had disposed of its apparatus business to the Wallace & Tiernan Company, so from that time on the control equipment for producing an acid bleach was made and installed by that company. A great many such installations have been made and the resulting economies are many. This phase of the

A Flash Light in the Dark

LOOKS like a damp, dark cellar—rather inaccessible too, and there's a pool of water under the flywheel. Can't imagine the master mechanic working up much enthusiasm in inspecting this drive. But why worry? He doesn't. He knows it's a GOODRICH "COMMANDER" belt that won't need attention—that it will be running today, tomorrow and next year just as steadily as it is now.

Moisture won't affect it. He needn't bother about stretch. And as for heavy work, sudden strains, carrying the load without slipping—that's what it's built to do.

"COMMANDER" can be depended upon to carry the load, steadily, efficiently, year in year out. And when worn out through long use, the costs per unit of service will show that "COMMANDER" is actually more economical to use than the belt whose chief talking point is price.

THE B. F. GOODRICH RUBBER COMPANY
Akron, Ohio

Goodrich
Commander
TRANSMISSION BELTS

The Best Way to Bark Wood is by Drum and There is a Best Drum

OUR drum design accomplishes wet barking, a most important—and exclusive—feature.

The slotted construction permits the free escape of bark as removed.

Barking capacity of our drum is not approached by any other type of drum of similar size.

The flexibility of chain suspension—hot rolled U-bars of such shape as gives tremendous strength and permits a solid job of riveting to channel rings—a surface of perfect tumbling efficiency which still cannot bruise the wood—these are more than talking points.

Speaking ot durability, our drums have in numerous instances been operated continuously for six years—not months—without an hour's loss of time by breakdown. The specifications of our drums are interesting, but their field records are conclusive.

FIBRE MAKING PROCESSES, Inc.
Tower Building
CHICAGO, U. S. A.

application of Liquid Chlorine to the paper industry was discussed a year ago before this organization.

The purpose of this paper is to discuss the adaptation of Liquid Chlorine to the bleaching of those fibres which do not respond to an acid bleach or where, because of the large quantities of chlorine necessary, it would be impractical to carry it in solution in water.

Our work soon narrowed itself to using a lime base because of its cheapness, notwithstanding the fact that under certain circumstances a soda base shows some advantages and is actually employed in some mills.

Our first practical installation using a lime base was at the plant of the Carso Paper Company, Dansville, N. Y. This was installed early in 1917, but owing to the pressure of war work, was not on a basis satisfactory to either the user or to ourselves until the beginning of 1919.

After remodeling this installation to our satisfaction, we undertook to standardize our practice and we now present the following description and layout of a typical liquid chlorine bleach-making plant.

The bleaching agent we produce is calcium hypochlorite solution, which of course is of the same chemical composition as the solution made from dry bleach powder, but does differ markedly in some of its physical qualities.

The chemicals used are Liquid Chlorine as the active agent and a high calcium lime as the base. Either quick lime or hydrated lime may be utilized; the former is probably less expensive but the latter more convenient, as quick lime must be slaked and cooled before it is suitable for use. Where quick lime is employed, one pound of lime is required per pound of Liquid Chlorine absorbed. Where hydrated lime is used, one and one quarter pounds of lime are necessary per pound of chlorine absorbed, the accuracy of these figures depending upon the purity of the lime in terms of calcium oxide. The difference in proportion between the lump and hydrated lime is accounted for by the moisture content in the hydrated product. In either case the quantity of lime used provides a sufficient excess to insure an alkaline liquor as a result.

The accompanying sketch (Fig. No. 1) will serve to show the procedure we take. This sketch indicates what we have arbitrarily called a circulation tank, a sludge tank, a centrifugal pump, an absorption tower and a storage tank. In the circulation tank we place a measured quantity of lime and water which is kept in continual agitation. This resultant solution is pumped to the top of the absorption tower which is simply constructed of stoneware tower sections mounted on a special concrete base so designed that a liquid seal is formed to prevent the escape of any free gas during operation. The tower is packed with small cylindrical stoneware rings to give a large absorption surface. After the milk of lime is in good circulation, the chlorine gas is allowed to flow through an ordinary iron pipe to the base of the tower, where the counter currents of gas and lime solution provide a condition suitable for the chemical combination of both ingredients. From the base of the tower, the solution flows back into the original tank and the circulation continues until the solution is built to any desired strength up to fifty grams per litre, after which agitation is stopped and the liquor allowed to settle; the clear solution being drawn off through a decanting pipe to the storage tank where it is ready for use. During the entire process both lime and chlorine flow at a uniform rate; the rate of flow of

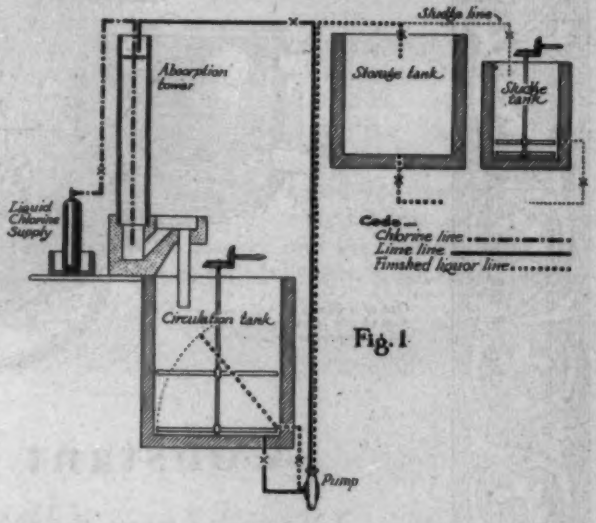


Fig. 1

chlorine being at the control of the operator, which may be from a few pounds per hour to fifteen hundred pounds per hour. It has been the custom to measure the gas in units of 100, 150 or 2,000 pounds, or any multiple thereof which corresponds to the capacity of our containers, but where tank cars are in use the gas is either measured through a flow meter or the strength of the liquor is determined by titration.

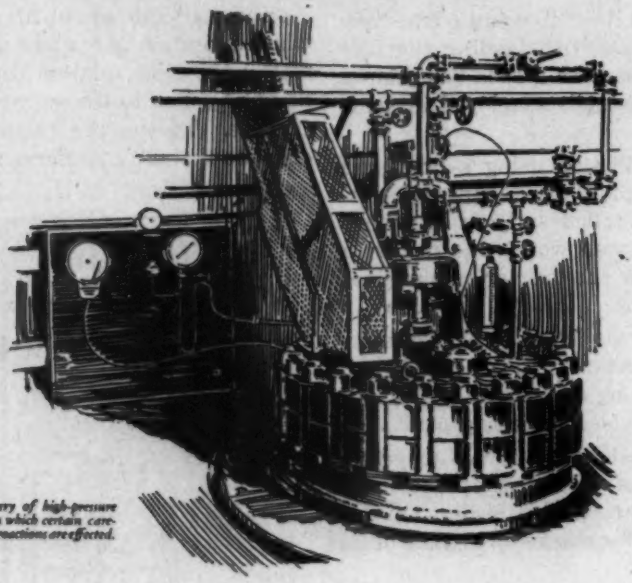
The small amount of sludge remaining after each batch is allowed to accumulate until the quantity warrants washing it, when it is pumped into the sludge tank and agitated with additional quantities of water. Here the sludge is washed twice and the clear liquor run into the circulation tank for use as "make up" liquor for a fresh batch of bleach. At the present time and especially where old dry bleach plants are converted to the Liquid Chlorine process, the sludge washing tank has been entirely eliminated, as we have found that this treatment can usually be carried out in the circulation tank.

Our next problem was to build a bleach plant which should be as nearly ideal as we knew how to build it. This could best be done at a new mill which had no equipment to be salvaged or reworked.

DU PONT

VAT ACID CHROME BASIC SULFUR DIRECT

DYESTUFFS



One of a battery of high-pressure fusion-kettles in which certain carefully controlled reactions are effected.

Constant Vigilance

IN order to insure the production of standard uniform dyestuffs, every step in their manufacture must be under constant observation.

Pressure, temperature, speed of agitation as well as duration of reaction are vital factors which, if not kept under absolute control during dyestuffs manufacture, destroy every desirable quality.

The excellence of Du Pont plant control is reflected in the *uniformity* of the product. You get *uniform* results from *uniform* Du Pont Dyestuffs.

E. I. du Pont de Nemours & Co., Inc.

Dyestuffs Department

WILMINGTON DELAWARE

BRANCH OFFICES:

New York Boston Providence
Philadelphia Chicago
Charlotte, N. Car.

STANDARD DU PONT DYESTUFFS UNIFORM

The opportunity presented itself at the plant of the Lincoln Paper Mills Co., Ltd., Merritton, Ontario, Canada, and the work was done in conjunction with their consulting chemist, Mr. W. P. Cohoe, and their superintendent, Mr. G. J. Armbruster, in the winter of 1919-1920.

The plant was designed to make bleach liquor for twenty tons of sulphite pulp per 24 hours, but in recent months this plant has bleached as much as 30

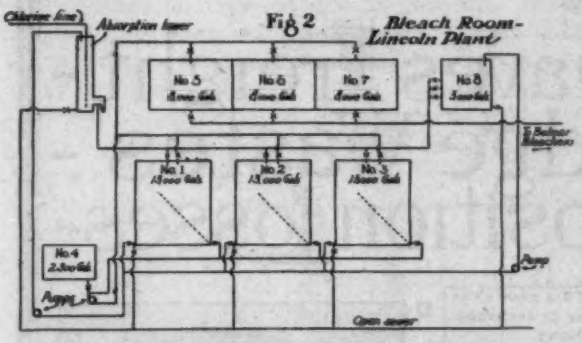


Fig 2

tons and could handle as much as 50 tons per day, except for other limiting features in the mill.

The equipment is installed in a concrete and steel building, 25 x 73 feet on the ground x 35 feet in height with a monitor on one end of the roof to house the top of the absorption tower. The roof is a concrete slab. The building conforms to the type and structure of the other mill buildings. It is served by two railroad sidings. This building has no general floor levels above the ground, but platforms and stairways were constructed so as to give easy access to tanks and apparatus above ground level.

A lime storage building adjoins the main building at the end where the hydrating tank is located and has a storage capacity of 75 tons.

A list of equipment follows:

One round steel hydrating tank of 2,300 gallons' capacity with agitator and hydrating basket.

Three round reinforced concrete circulating tanks of 13,000 gallons' capacity with agitators.

Three square reinforced concrete tanks for storage of finished liquor, each with capacity of 8,000 gallons.

One reinforced concrete absorption tower packed with stoneware rings. One Liquid Chlorine evaporator for use with tank cars.

One reinforced concrete sludge washing tank of 3,000 gallons' capacity with agitators.

One platform scale for weighing lime. Three 2½-inch centrifugal pumps with the necessary shafting and piping.

From April 15th to 28th, 1921, a test was run at this plant, the purpose of which was to determine under operating conditions the efficiency with which Liquid Chlorine could be absorbed and the resulting hypochlorite liquor handled up to the point of entering the Bellmers. This test we now report in detail.

Operation of the Bleach Plant

The general operating procedure is exactly that followed under the typical layout previously described. Burned lime is slaked with fresh water in the hydrating tank No. 4 (see Fig. No. 2), and the resulting milk is pumped into one of the circulating tanks 1, 2 or 3, where after cooling, it is diluted with water, or with water and wash liquor, to a volume of from ten to twelve thousand gallons. The diluted batch of milk of lime is then circulated through the absorption tower and back into the same tank; chlorine being absorbed at the rate of from four hundred to five hundred pounds per hour, the latter being drawn from the tank car through an evaporator which converts the liquid into a gas, in which form it is absorbed.

When the available chlorine strength reaches 35 to 40 grams per litre, depending upon the amount of excess lime present, the chlorine supply is shut off, the circulation stopped and the liquor allowed to settle.

The clear liquor is pumped into one of the storage tanks 5, 6 or 7, and is ready for use in the Bellmers. The sludge is pumped into the sludge washing tank No. 8, where it is mixed with fresh water, agitated

Hydrating Tank

and then allowed to settle, the clear liquor being run into a circulation tank and the remaining sludge rewashed.

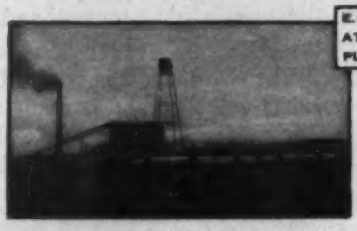
Conducting the Test

The entire contents of a tank car of liquid chlorine were used in making the efficiency test, this amount—approximately 30,000 pounds—being absorbed in making up ten batches of bleach liquor.

In calculating the efficiency of absorption, the ac-

Let us tell you how bleaching with **Liquid Chlorine**

Saves Freight - Eliminates Sludge Wastes - and Decomposition Losses -

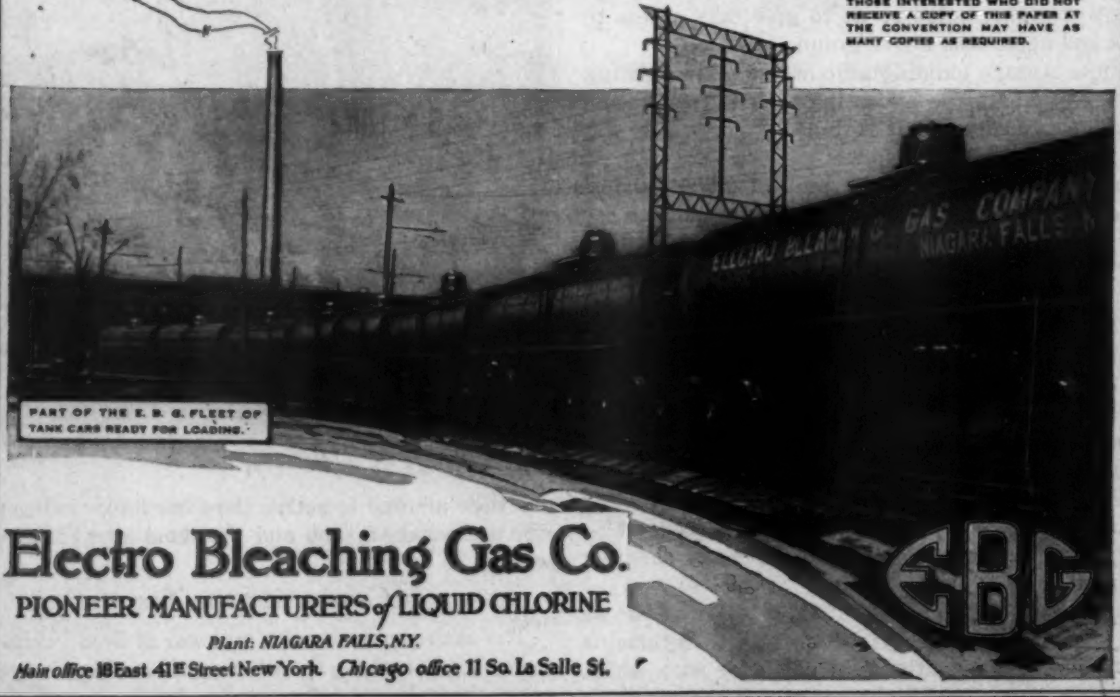


E. B. G. TANK CARS AT CUSTOMER'S PLANT.

A TANK CAR OF LIQUID CHLORINE AT UNLOADING SHED—SAME PLANT.

PRODUCING BLEACH LIQUOR WITH LIQUID CHLORINE IN THE PULP OR PAPER MILL.
BY S. W. JACOBS AND H. P. WELLS OF THE TECHNICAL STAFF OF
ELECTRO BLEACHING GAS COMPANY —

THOSE INTERESTED WHO DID NOT RECEIVE A COPY OF THIS PAPER AT THE CONVENTION MAY HAVE AS MANY COPIES AS REQUIRED.



PART OF THE E. B. G. FLEET OF TANK CARS READY FOR LOADING.

Electro Bleaching Gas Co.

PIONEER MANUFACTURERS of LIQUID CHLORINE

Plant: NIAGARA FALLS, N.Y.

Main office 18 East 41st Street New York. *Chicago office* 11 So. La Salle St.

EBG

tual weight of chlorine charged into the system was determined by weighing the tank car before and after the test on the same track scales.

The weight of chlorine actually absorbed in the system was measured in the following manner:

At the point where the diluted milk of lime in the circulating tank was ready for circulation through the absorption tower, the volume was measured, and an average sample assayed for available chlorine, fixed chloride and for chlorine as chlorate. After the batch had been made and the gas supply shut off, the volume was again measured, and an average sample assayed as before. From this data it was possible to calculate the weight of chlorine absorbed in making the batch and to determine the percentage absorbed in active form. The total weight of chlorine absorbed during the test was arrived at by adding together the net weights for each of the ten batches of bleach liquor.

The weight of chlorine lost in sending the residual sludges to the sewer was measured as follows:

When a batch of sludge was ready to send to the sewer, its volume was measured and an average sample assayed for available chlorine. From this data it was possible to calculate the weight of available chlorine sent to the sewer for this batch. The total weight lost in this manner during the test was arrived at by adding together the weights for each of eight batches sent to the sewer.

Standard analytical methods were employed throughout the test, viz.:

(a) **Available Chlorine**—Titration with sodium arsenite solution with iodized starch paper as external indicator.

(b) **Chlorine as Chloride**—After the available chlorine has been reduced to chloride by the arsenite solution, the total chloride is determined by standard silver nitrate solution according to the Volhard method.

(c) **Chlorine as Chlorate**—After the available chlorine has been neutralized by arsenite solution, a weighed quantity of ferrous iron is brought into reaction with the chlorate, the excess iron being measured by standard permanganate solution.

Result of Efficiency Test

1. **Efficiency of absorption.**

The gross and tare weights of tank car F. T. X. 2009 were as follows, the weight being read to the nearest hundred:

Gross Wt.	(12-29-20) Niagara Jc. R. R.	75,800 ± 50 lbs.
Tare Wt.	(5-3-21) Niagara Jc. R. R.	45,800 ± 50 lbs.
Net Wt		30,000 ± 100 lbs.

Therefore the actual weight of chlorine charged into the system lay between the limits 29,900 and 30,100 lbs.

As shown on the attached data sheet No. 1—

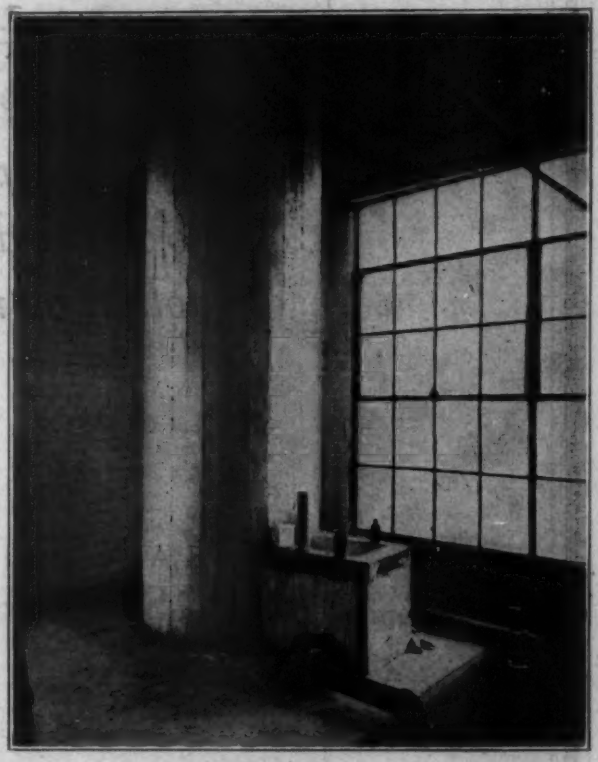
Total weight of chlorine in finish liquors	32,642 lbs.
Total weight of chlorine initially in liquors	2,602 lbs.
Net weight	30,040 lbs.

Therefore the net weight of chlorine actually absorbed in the system was 30.040 pounds.

Thus all the chlorine charged is accounted for and the efficiency of absorption is practically 100 per cent.

2. **Percentage of Availability of the Absorbed Chlorine**

As shown on the attached data sheet No. 1—



Absorption Tower

Total weight of available chlorine in finished liquors	32,317 lbs.
Total weight of available chlorine initially in liquors	2,527 lbs.
Net weight	29,790 lbs.

Therefore out of a total of 30,040 pounds absorbed, 29,790 was in the active or available form. This calculates to 99.17 per cent.

To cite a typical batch, take run No. 5 of April 21st, where the finished liquor tested 38.55 g. p. l. available chlorine and 38.87 total chlorine. This particular batch calculates to the same percentage of availability as the average, namely 99.17 per cent.

3. **Chlorate Formation**

Any fear felt prior to the test that chlorate formed

The 'Heart' of the Mill

Unless it keeps throbbing the finished paper does not go out the door and the dollars do not come in.

Ask us about our variety of
STUFF PUMPS

Beloit Iron Works
Beloit, Wisconsin

RECORD SHEET OF EFFICIENCY TEST --- LINCOLN PLANT APRIL 15- 28, 1921.

Run No.	Date	Circ. Tank No.	START OF RUN: Depth Down	Liquor Column	Net Area Sq. Ft.	Allowance Cu. Ft. St.	Allowance Cu. Ft. Grout	Net Vol. Cu. Ft.	Active Chlorine P.P.L	Active Chlorine Lbs. Cu.Ft.	Active Chlorine Total Lbs.	Total Chlorine P.P.L	Total Chlorine Lbs. Cu.Ft.	Total Chlorine Total Lbs.	END OF RUN: Depth Down	Liquor Column	Net Vol Cu.Ft.	Active Chlorine P.P.L.	Active Chlorine Lbs. Cu.Ft.	Active Chlorine Total Lbs.	Total Chlorine P.P.L.	Total Chlorine Lbs. Cu.Ft.	Total Chlorine Total Lbs.
1	4-15	1	7'1½"	7.62'	121	1.00	21	907	10.08	.630	571	10.21	.637	577	4'10"	8.82'	1178	40.40	2.521	2974	41.24	2.573	3033
2	4-18	2	7'6"	7.26'	120.9	1.00	12.5	874	0.19	.012	10	0.19	.012	10	5'11"	8.03'	1066	36.67	2.287	2437	36.72	2.292	2442
3	4-19	2	7'2"	7.73'	120.3	1.00	15.0	914	0.16	.010	9	0.16	.01	9	5'10"	8.06'	1074	36.4	2.271	2430	36.61	2.285	2456
4	4-20	1	52"	10.43'	121	1.00	21	1241	0.33	.020	25	0.33	.020	25	22"	12.93'	1542	36.22	2.260	3486	36.31	2.265	3493
			15" Rest.					241	0.56	.034	8	0.55	.034	8									
5	4-21	2	Cont. 61"	5.08'	120.3	1.00	15	896	0.71	.044	28	0.71	.044	28	36"	11.0'	1418	36.8	2.406	3408	36.87	2.424	3430
6	4-22	1	Cont. 87"	9.78'	121	1.00	21	882	0.78	.049	27	0.78	.049	27	29"	12.34'	1471	36.88	2.309	3385	37.10	2.318	3406
7	4-26	2	22"	13.06'	120.3	1.00	15	1665	9.67	.616	552	10.27	.655	587	0"	14.75'	1888	37.75	2.414	3602	38.10	2.438	4033
8	4-26	1	Cont. 39"	3.25'	121	1.00	21	371	0.84	.052	19	0.84	.052	19	33"	12.01'	1431	37.84	2.361	3379	38.28	2.388	3416
9	4-27	2	5'	9.84'	120.9	1.25	15.5	1139	7.05	490	876	8.33	579	611	13.5"	15.77'	1846	35.75	2.231	3630	36.4	2.271	3736
10	4-28	1	0'	8.78'	121	1.00	21	1038	4.6	.287	298	4.6	.287	298	28"	12.56'	1801	35.75	2.108	3163	36.1	2.127	3190
									TOTAL		2827			2902						32317			32542

TANK DIMENSIONS	No. 1 C. T.	No. 2 C.T.	No. 3 C. T.	Hyd. Tank
Diam.	12'-6 15/16"	12'6 3/4"	12'6 3/4"	8'6"
Depth	14'-9 1/2"	14'10"	14'10 1/2"	5'6"
Area Sq.Ft.	122.4	121.7	122.3	56.7
Deduct 4 Pil-asters	1.4	1.4	1.4	
Net area sq. ft.	121	120.3	120.9	56.7
Grout cu.ft.	21	15	12.5	
Stirrer cu.ft.	1.43 @ 12'	1.22 @ 12'	1.22 @12'	

NOTE:- Temperature of circulated liquors did not exceed 30° C.

1

RECORD SHEET OF EFFICIENCY TEST LINCOLN PLANT --- APRIL 15-28, 1921.

SLUDGE DATA

Sewer Disc. No.	Date	C. Tank No.	Inches Disc.	Liquor Column	Net Area Sq. Ft.	Gross Volume Cu. Ft.	Grout Allowance Cu. Ft.	Net Volume Cu. Ft.	C. P. L. Available Cl.	Lbs. per cu. ft. Available Cl.	Total Lbs. Available Cl.
1	4-20	2	14	1.17'	120.3	141	15	126	1.84	.115	15
2	4-21	1	12	1.00'	121	121	21	100	1.26	.079	8
3	4-22	2	13	1.08'	120.3	130	15	115	0.79	.049	6
4	4-26	1	11	0.91'	121	110	21	89	1.84	.096	9
5	MARELAGHLIN	1	-	-	-	-	-	-	-	-	4.8
6		2	-	-	-	-	-	-	-	-	7.1
7		3	-	-	-	-	-	-	-	-	27.6
8		Silt	-	-	-	-	-	-	-	-	14.7

MARELAGHLIN WELLS

CHLORATE TABLE FINISHED LIQUOR

Run No.	Date	Aliquot-ed Sample	Per. Am. Sul	C.C. $KMnO_4$	C.P.L. Cl as Chlorate	C.P.L. Total Chlorine	% of Cl as Chlorate	Chlorate Cl Lbs. per 1000 Cu. Ft.
1	4-15	5c.c.	1 g.	24.7	0.0305	41.24	.073	0.72
3	4-19	5c.c.	1 g.	24.9	None	36.61	None	None
6	4-22	5c.c.	1 g.	24.7	0.0469	37.10	.181	1.81
8	4-26	5c.c.	1 g.	24.7	0.0468	36.28	.127	1.27
10	4-28	5c.c.	1 g.	24.9	None	34.10	None	None

10. Per. Am. Sul. 24.8 c.c. K Mn O_4

98 Lbs. Av. Cl Loss in Sludge

ALKALINITY FINISHED LIQUOR

Run No.	Date	C.C. in Sample	C.C. N/10 Sol.	O.P.L. Excess CaO
1	4-15	12.5	15.1	5.38
2	4-19	12.5	16.3	5.65
3	4-19	12.5	7.8	1.75
4	4-20	12.5	12.4	2.78
5	4-21	12.5	21.6	4.85
6	4-22	12.5	10.4	2.23
7	4-25	12.5	31.3	7.00
8	4-26	12.5	14.2	3.16
9	4-27	12.5	25.2	5.65
10	4-28	12.5	34.5	7.74

Used empirical method, shaking the sample, aliquoting off 12.5 c.c., destroying active chlorine with neutral hydrogen peroxide, diluting to 250 c.c. and running in 1/10 NCl until the approx. final fading of phenolphthalein indicator.

BURNED LIME TABLE

Date Charged	Tank No.	Wt. Charged
Before 4-15	#1 C.T.	2500
	#2 C.T.	2700
	#3 C.T.	2700
4-19	#1 C.T. Hyd.	2000 600
4-20	#2 C.T.	3600
4-21	#1 C.T.	3600
4-22	#2 C.T.	3600
4-25	#1 C.T.	3600
4-26	#3 C.T.	2200
4-27	#1 C.T.	3300

31,600 Lbs. Lime

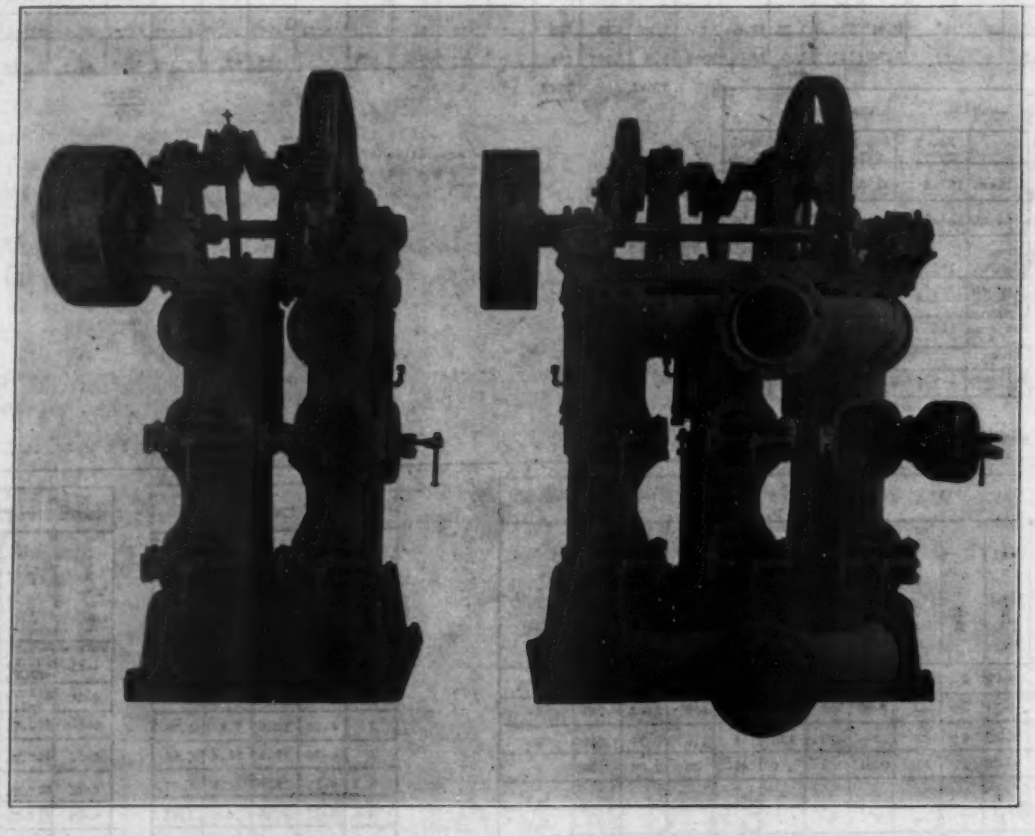
106.2 Lbs. Lime per 100 Lbs. Chlorine

2

THE BLACK-CLAWSON CO.

HAMILTON, OHIO, U. S. A.

Builders of all Types of FOURDRINIER and CYLINDER Paper Making Machines that Produce Paper of Quality in Maximum Quantities



OUR STUFF PUMPS are built right for accessibility, durability and economy—

OUR PATENT VERTICAL drying system exclusively built by us with about 2000 cylinders installed to date. No board machine is complete without them. Increases production, finish, etc. Let us tell you why.

Improved Jordan Engines, Container Board Pasting Machines, Combining Machines, Paraffining Machines, Agitators, Screens and other Paper Mill Equipment.

The use of our machinery continues to be an excellent method of securing the maximum value at minimum cost.

in appreciable quantities, was proven to be groundless.

As shown in the chlorate table on attached data sheet No. 2, it was found that in several instances the finished liquors contained no chlorate at all, while others showed a trace. The maximum value found was 1.31 lbs. of chlorine as chlorate out of 1,000

Evaporator, Showing Chlorine Meter

pounds of chlorine absorbed in the system or 0.131 per cent.

A study of the "chlorate reaction" indicates that of 6 pounds of chlorine entering into this reaction, 5 pounds form fixed chloride, while 1 pound enters as a component of the chlorate salt, viz.:

$$6\ Ca\ (OH)_2 + 12\ Cl = 5\ Ca,\ Cl_2 + Ca\ (ClO_3)_2 + 6\ H_2O.$$

Since it was shown by actual test that but 0.83 per cent. of the absorbed chlorine was present as fixed chloride, this at once places a limiting value of 0.17 per cent. on the weight of chlorine as chlorate. Moreover, since some of the fixed chloride in the finished liquor was unquestionably due to direct loss of oxygen during the circulation of the liquors—and not all due to the "chlorate reaction"—it follows that the chlorine as chlorate must be less than 0.17 per cent. of the chlorine absorbed. (See maximum value of 0.131 per cent. noted above).

4. Loss of Available Chlorine in Sludge.

Since it was found that the necessary space was available, the washing of the various batches of sludge was carried out in the circulation tanks instead of the sludge-washing tank.

It was once more demonstrated that one of the greatest advantages this system has over the system employing dry bleach, lies in the very small loss of available chlorine in the spent sludge. As shown in the sludge table on attached data sheet No. 2, but 92 pounds of available chlorine were lost when the spent sludges were finally sent to the sewer. Since the total weight of available chlorine absorbed during the run was 29,790 pounds, the percentage lost in discharging the sludge was 0.31 per cent.

5. Lime Requirements.

As shown in the burned lime table on attached data sheet No. 2, the total weight of burned lime charged into the system during the test was 31,600 pounds, which calculates to 1,052 pounds per 1,000 pounds of chlorine absorbed.

6. Alkalinity of Finished Liquors.

An empirical method was employed in determining the excess of lime in the finished liquors. Due to the relatively low solubility of lime in water, the results obtained by this method are just a trifle low. As shown in the alkalinity table on data sheet No. 2, it was found that the finished liquors before settling varied in lime content between the limits of 1.75 and 7.74 g. p. l., excess CaO.

The clear settled liquors contained about one g. p. l. excess CaO in solution, the amount being fairly constant.

May we draw one general conclusion from this test, namely, that close to 99 per cent. of the Liquid Chlorine purchased by the paper or pulp mill is actually consumed in the bleaching of the stock and that the combined losses of chlorine from all sources are slightly in excess of 1 per cent? The production

Circulation Tanks

of bleach liquor from Liquid Chlorine then is accomplished in a most efficient manner.

This test did not give us any comparison between the cost of makng bleach liquor in this way, and the cost of similar liquor made from dry bleach.

Generally speaking, the economies to be effected by the use of Liquid Chlorine are derived from:

Modern Needs for Efficient Slitting and Roll-Winding Machines

IT WAS not so long ago that the process of Slitting and Roll-Winding was of little importance in paper manufacture or the conversion of paper into its products, as the bulk of the product of a mill was consumed in sheet form, and for such paper as was required in roll form, any crude method was good enough. The customer was not over critical as to the character of the rolls as long as the quality of the paper was all right. Modern standards, however, have become more and more particular regarding the rolls themselves, aside from the quality of the paper. Moreover, the increasing demand for roll paper in narrow widths, has made the Slitting and Roll-Winding problem increasingly harder to deal with.

The demand for all kinds of paper in roll form has grown rapidly, owing to the introduction of a hundred and one mechanical processes in which roll paper is used in preference to sheets, as, for instance, web printing machines, automatic wrapping machines, adding machines, recording and registering machines, and a host of others. Aside from these uses is the enormous consumption of wrapping paper in the form of counter rolls, and of roll paper of various kinds used in the manufacturing lines, such as the insulation of wire and cable, box trim, ribbon blocking, paper fabrics, tire wrappers, etc. The requirements for accurate clean-cut rolls of every conceivable width, and of every size from "Midget Rolls" to "Jumbo Rolls" have necessarily become more and more extensive and exacting.

Cameron Slitting and Roll-Winding Machines of various types and sizes, known to the trades they serve as "CAMACHINES" (their registered Trade Mark name), are the result of twenty-four years of experience and engineering skill devoted solely to this class of machinery.

"CAMACHINES" make it possible to realize the most exacting standards of modern requirements as to speed, accuracy and economy of waste.

CAMERON MACHINE COMPANY
61 POPLAR ST. BROOKLYN, NEW YORK

CAMACHINE

PATENTEE AND BUILDERS OF CAMERON MACHINES

CAMACHINE

First: Saving chlorine usually washed to the sewer with the sludge.

Second: The use of a material that will not decompose during transportation and storage.

Third: Producing a nearly neutral bleach that is extremely active when in contact with the pulp.

As to the waste of chlorine in the sludge where dry bleach is used, each mill must of necessity be its own judge as to its extent, and while awkward to admit openly, it must certainly be recognized. We have visited many mills in the last few years and find that 5 per cent. chlorine loss from this source is not uncommon and know of one large mill where 25 per cent. was the rule. In comparison with Liquid Chlorine, one needs only to turn to the test at the Lincoln Paper Mill which shows the chlorine lost in sludge to be 0.31 per cent. and this figure is duplicated in many other mills.

There is, of course, no deterioriation in the case of Liquid Chlorine during indefinite storage, while weather conditions greatly affect the chlorine content of dry bleach. Over a period of a year a 33 per cent. average chlorine content is all that can be consistently expected of dry bleach at the mill. Incidentally there is hardly a paper mill which has not had many claims to press on this point.

In taking up the third item of a neutral bleach, may we recite an instance at the Paul A. Sorg Paper Company, Middletown, Ohio, which plant was changed over to Liquid Chlorine early in 1920? Their records indicate that while they are using the same amount of chlorine to bleach as they did previous to installing their Liquid Chlorine process, an analysis of the furnishing will show that much harder bleaching pulps are now used than heretofore.

The question of alkalinity has been looked into by Mr. Sorg and Mr. Roe of that company in an experimental way. The experiments were conducted in the following manner:

One hundred grams of air-dry pulp were disintegrated and made up with water to a consistency of 6 per cent. To this was added bleach liquor calculated to 25 per cent. dry bleach. The bleach was left in contact with the fibre for one hour, stirring every five minutes. At the end of an hour a portion of liquor was drawn off and titrated, and the amount of chlorine left in the mass was calculated. In one case the bleach liquor had an alkalinity of 0.3 (alkalinity is expressed as the number of c.c. of N-10 hydrochloric acid required to neutralize 10 c.c. of strong bleach liquor). In the other case, a bleach having an alkalinity of 2.8 was used. In the case of the 0.3 alkalinity, they found that 92 per cent. of the total amount of chlorine was consumed and only 80 per cent. of the 2.8 alkalinity. The color produced by the bleach of low alkalinity was somewhat better than the other. In both cases the bleach liquor was filtered before using and the experiments were conducted at room temperature.

The result of this experiment, while it may not appear conclusive, bears out their findings in actual practice that there is an economic advantage in favor of a low alkalinity bleach.

The difficulty of making direct comparisons even at plants that have been changed over from dry bleach to Liquid Chlorine is very great because of the varying quality of the dry bleach, especially in chlorine content, and the uncertain degree of efficiency of operation in a dry bleach plant, because of many factors difficult to control. However, the three items mentioned above go to make up a certain ratio which exists between dry bleach and Liquid Chlorine,

Circulation Tanks, Showing Pipe Connections

and while this ratio may vary in the different mills it is now pretty well established to be much in excess of the theoretical ratio of 3 to 1. That is, three pounds of dry bleach will not bleach, on the average, nearly as much as 1 pound of Liquid Chlorine.

In considering the labor question, we call your attention to our experience at the plant of the Fraser Co., Ltd., of Edmunston, N. B. Here we found a dry bleach plant which was inadequate to dissolve and store a sufficient quantity of liquor made from dry bleach. In December, 1920, Liquid Chlorine was introduced and without other changes than the addition of the necessary absorption towers, the bleach plant was increased to the capacity of the Bellmers and the number of men making bleach liquor was reduced, effecting a saving of $13.00 per day.

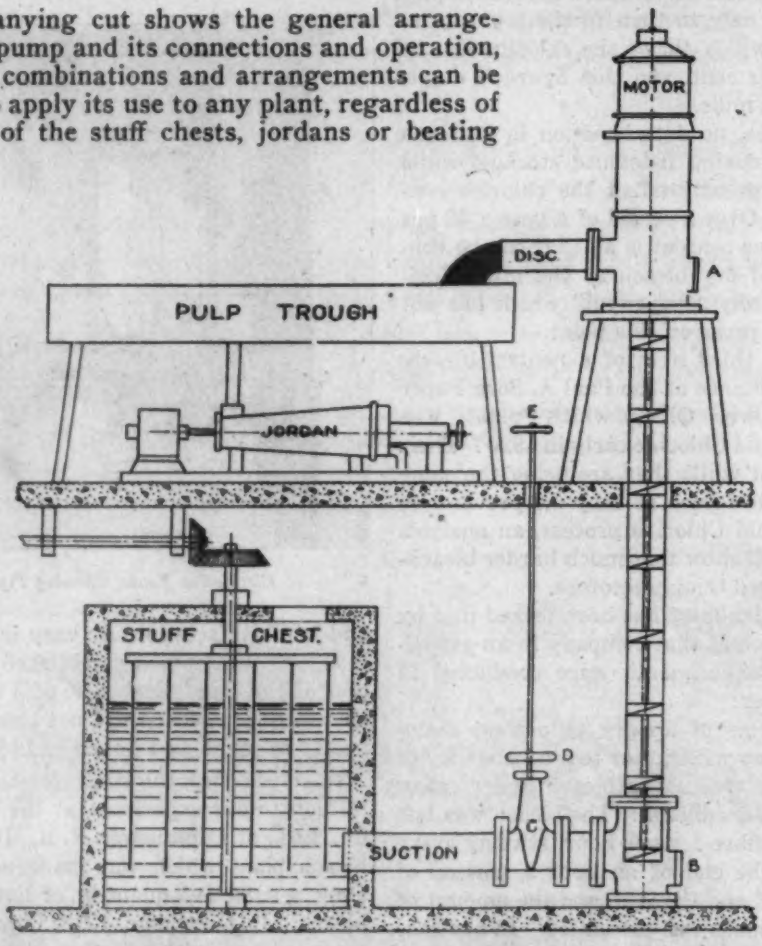
The handling of heavy drums is entirely dispensed with, especially where tank cars are in use, and yard labor is cut to a minimum; and right here may we emphasize that in some large mills the disposal of bleach drums and large quantities of sludge make up an item of expense which is eliminated with the use of Liquid Chlorine.

GREGG

Paper Mill Propellor Stuff Pump

This is a vertical rotary type of pump and does not contain any valves or contracted passages, or chambers for the stock to lodge in and is absolutely reliable and dependable in every way and superior to any type of stock pump heretofore used by the paper trade.

The accompanying cut shows the general arrangement of this pump and its connections and operation, but different combinations and arrangements can be made so as to apply its use to any plant, regardless of the location of the stuff chests, jordans or beating engines.

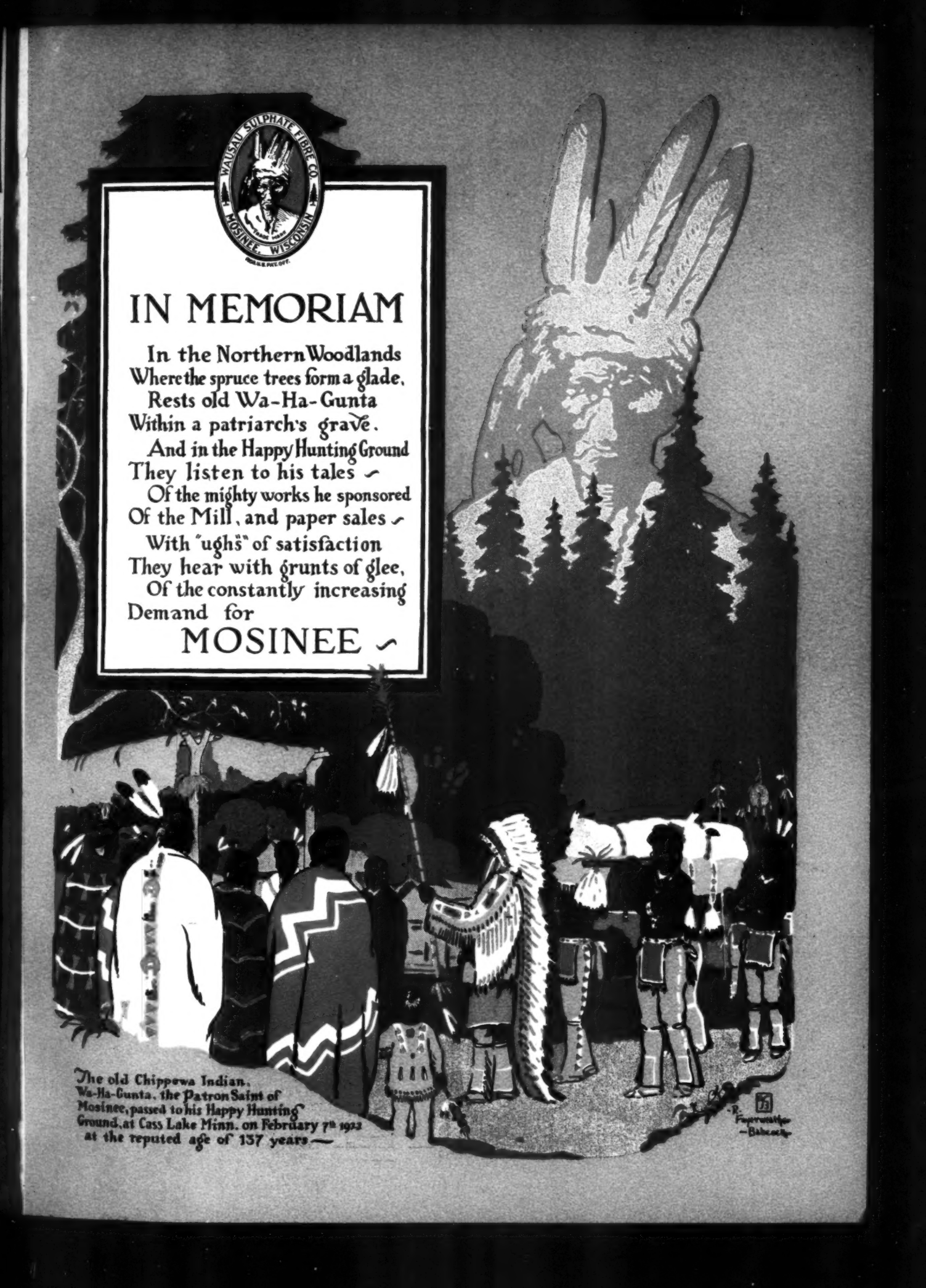


The capacity of this pump can be regulated by the gate valve in the suction line; this makes it a very flexible and easily handled pump. The action of the propellors keeps the stock broken up and agitated while on its passage through the pump, so that heavy stock or stock with pieces of metal, rope or sticks in same can be handled with safety For examination or in cleaning the pump the hand hole plates "A" & "B" can be removed and a stream of water turned in opening "A" and the pump washed out thoroughly in a few moments and placed in service again.

MANUFACTURED BY

GREGG PUMP COMPANY

127 and 129 Southwest Blvd. KANSAS CITY, MISSOURI


WAUSAU SULPHATE FIBRE CO.
MOSINEE WISCONSIN
IN MEMORIAM
In the Northern Woodlands
Where the spruce trees form a glade,
Rests old Wa-Ha-Gunta
Within a patriarch's grave.
And in the Happy Hunting Ground
They listen to his tales
Of the mighty works he sponsored
Of the Mill, and paper sales
With "ughs" of satisfaction
They hear with grunts of glee,
Of the constantly increasing
Demand for
MOSINEE
The old Chippewa Indian,
Wa-Ha-Gunta, the Patron Saint of
Mosinee, passed to his Happy Hunting
Ground, at Cass Lake Minn. on February 7th 1922
at the reputed age of 137 years —

THE STEADFAST
Unswerving
Unconquerable
Spirit of
Old
Wa-Ha-Gunta
Still
Abides in

MOSINEE KRAFT

There are other well-defined advantages in connection with the use of this product. Its cleanliness and freedom from flying bleach dust is reflected in the fact that it is not difficult to keep labor on the job, as the work is anything but disagreeable.

There is much less tank capacity required for Liquid Chlorine than for dry bleach, as the strength of the liquor can be made double that at which dry bleach liquor is usually used, so that the capacity of the average bleach plant built for dry bleach can actually be doubled by a Liquid Chlorine installation.

In connection with the above, Liquid Chlorine produces an exceptionally rapid settling liquor due to its limited lime content, with a consequent increase in turnover in equipment.

Of interest to those whose duty lies in technical control will be the fact that an absolutely uniform strength liquor can be made with Liquid Chlorine. Once a standard is set it can be maintained indefinitely, up to 50 g. p. l.

It seems useless here to try and give any estimate as to the cost of an entirely new Liquid Chlorine installation such as the Lincoln Paper Bleach plant, as the size of the plant, the kind of pulp or paper to be bleached and many other variables enter into the problem. In a general way, however, a comparison of the first costs of a new dry bleach plant with that of a new Liquid Chlorine plant will show the latter to be considerably cheaper, due first to the fact that Liquid Chlorine can be stored in less space than its equivalent of dry bleach, and second, because less tank capacity is required for settling and storage, and this saving should, in our opinion, amount to at least 20 per cent.

The reconstruction of old bleach plants for the use of Liquid Chlorine is our usual problem and has in the majority of cases been a simple one. In addition to the absorption tower which can be constructed by the mill itself, there are usually a few pieces of special equipment such as the evaporator, chlorine valves, etc., which are now standardized. The cost of the absorption tower and special equipment is less than $1,000.00. Most mills must also figure on making a few changes in the piping arrangement and possibly the addition of a new pump to the present equipment. Considering the advantages to be gained, the cost of making these changes is of such minor importance as to be negligible.

Economic conditions brought about by post-war deflation have caused business in general (the pulp or paper mill included) to seek economies in production in an effort to meet a lower selling price.

While the importance of the bleaching operation varies greatly in mills, nevertheless there is no mill in which it is not of sufficient importance to warrant the closest scrutiny.

Note.—Due recognition is given Mr. J. R. MacMillan, Chief Chemist of the Niagara Alkali Co. and the Electro Bleaching Gas Co., who gave much time and thought through the early work up to the present wide commercial adaptation of Liquid Chlorine to the needs of the paper industry.

The Forty-Fifth Annual Convention of the American Paper and Pulp Association

Held on April 10, 11, 12, 13 and 14, 1922, at the Waldorf-Astoria Hotel, New York

(By Special Correspondent)

THE forty-fifth annual convention of the American Paper and Pulp Association and affiliated organizations at the Waldorf-Astoria Hotel in New York, on April 10-14, was well attended. The number of those present did not quite reach the total of last year's convention, but there was nevertheless almost a thousand paper and pulp manufacturers and mill officials in New York for the event, and virtually all of the prominent members of the industry from various parts of the country were there.

Two keynotes were sounded at the convention. One was OPTIMISM, the other CO-OPERATION. All those taking part in the gathering of paper and pulp producers seemed to be imbued with the spirit of optimism, and optimism was preached on all sides. With the paper and pulp manufacturing industry of the country showing marked improvement after a period of long-drawn-out dullness, with mills operating at larger capacity than in many months, with manufacturing and marketing conditions in a healthier state than in a lengthy interval, and with nearly every indication pointing to a continuance of improvement and increase in trade activity, those at the convention exerted every effort to buoy up sentiment and to instill confidence in paper and pulp producers that better times are ahead. Speakers almost without exception dwelled at much length on the subject of optimism and did what they could by the citing of statistics and the rendering of reports regarding industrial activity to create a better feeling among those attending the convention. It seems a certainty that the many paper and pulp manufacturers who were at the convention will return to their homes imbued with new confidence that improvement has actually set in in the industry and that continued expansion of business activity can be expected.

The matter of co-operation was accorded its due attention during the convention. Individual organizations of paper manufacturers and paper mill technicians, superintendents and others connected with papermaking establishments are becoming so numerous that it is well that at each convention of the American Paper and Pulp Association and its affiliated bodies more and more thought is being given to the subject of co-operation. Representatives of the Technical Association urged representatives of the superintendents' organization to co-operate more fully to the mutual advantage of both, paper manufacturers preached co-operation to paper jobbers and likewise the latter urged the former to work more closely together, pulp producers and representatives of the suppliers of raw material to paper mills entreated for a better understanding between members of the various organizations; at every turn the theme of co-operation was dwelled upon at considerable length, and there is no gainsaying that one of the gratifying accomplishments of the convention is the creation of a more intimate relationship between the several branches of the paper manufacturing, distributing and consuming industry.

Little of especial interest developed in connection with the election of officials of the trade organizations for the ensuing year. Carrying out the custom that has long been followed by

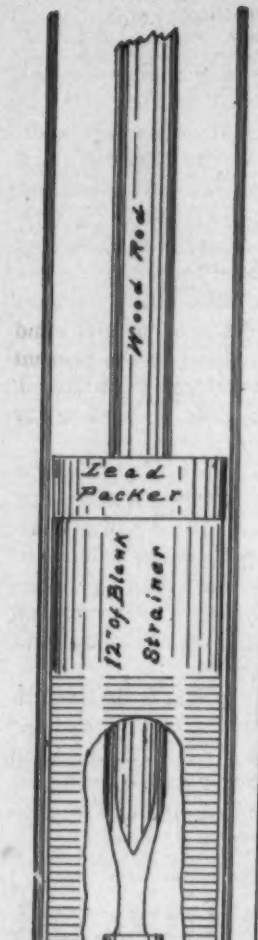


Fig. No. 56

For providing a Dependable Permanent Water Supply from Water Bearing Sand or Gravel Strata the

Cook System of Tube Well

has stood the test of time.

The pipe with drive shoe on the bottom is first sunk to a proper depth, or until a sufficient quantity of water-bearing sand or gravel has been penetrated. The strainer is then lowered to the bottom of the pipe with a hook screwed to the line of working rods, or pipe, whichever is used. The well pipe is then drawn back until all of the slotted portion of the strainer is exposed to the water-bearing stratum. While drawing the pipe back the working rods which have been used to lower the strainer should be left on the bottom so that it can be determined that the strainer is not also coming up. If it does stick, a light tap with the rods will loosen it (after the bottom of the strainer is well out of the pipe there is not much danger of its coming up any more). After the pipe has been drawn back the proper distance the lead packer, which is attached to the upper end of the strainer is set out against the pipe with a swedge block and bar, which makes a sand-proof joint between the pipe and strainer, thereby completing the well already to receive the pump.

Advantages of the COOK System

1. The strainer is in perfect condition when it reaches its proper place in the well as against the injured and clogged condition of strainers driven ahead of the pipe.

2. By learning the nature of the stratum in which the strainer is to work before it is lowered into the well proper size openings may be selected, while if strainer is driven ahead of the pipe, this important point is left to guess work.

3. The slots are cut from the inside and being larger on the inside than on the outside, will allow any particle which enters the slot to pass through and therefore will not choke up. The size of the slot depends upon the coarseness of the sand it is to guard against. In a sand of uniformly fine grains a slot must be selected which will exclude the greater part, but in a mixed sand and gravel ranging from fine sand to coarse gravel, slot may be selected to guard against the coarser particles only, the process of developing the well consisting in pumping out all the finer particles in the surrounding stratum and allowing the coarser particles to settle around the outside of the strainer in a large filter bed.

The length of strainer depends upon all the conditions of drilling, pumping and well construction. If unable to determine the size slot and length of strainer, send a liberal sample of sand (about one pound) for analysis at the factory and give the following information as nearly as possible:

1. The inside diameter of the well casing and state if standard pipe or standard casing is used.

2. Distance in feet from the top of the well casing or ground level at well top, stating which, to the point where the bottom of the strainer will rest.

3. The width of water-bearing sand and gravel penetrated.

4. Distance from same point at surface as selected in question No. 2 to water level when not pumping.

5. Number of feet water will probably be lowered by pumping.

6. Number of gallons per minute desired.

7. Type of pump to be employed—whether suction, impeller, centrifugal, air lift or deep well pump.

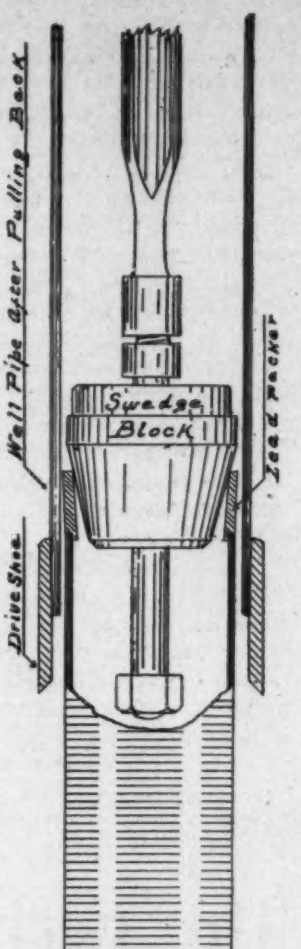


Fig. No. 57

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the American Paper and Pulp Association, and as a tribute of appreciation for his untiring efforts and beneficial work for the association during the past year, Walter J. Raybold, of the B. D. Rising Paper Company, Housatonic, Mass., was re-elected president of the American Paper and Pulp Association for a second term. Henry W. Stokes, of the York Haven Paper Company, York Haven, Pa., was re-elected eastern vice-president, and Arthur L. Pratt, of the Allied Paper Mills, Kalamazoo, Mich., was again chosen western vice-president.

Col. W. E. Haskell, of the International Paper Company, New York City; Louis Bloch, of the Crown Willamette Paper Company, San Francisco, Cal., and Sidney Mitchell, of the United Paperboard Company, New York City, were elected members-at-large of the Executive Committee. Grellet Collins, of Dill & Collins, Philadelphia, Pa., was chairman of the Nominating Committee which nominated the above candidates and there was no opposition to the ticket, the election being unanimous.

In his annual address, President Raybold took the occasion to make some comments on the growth and importance of trade associations in general and the American Paper and Pulp Association in particular, and also to remark on business conditions in the paper industry with a reference to the future. President Raybold's address follows:

Address of President W. J. Raybold

The Forty-fifth Annual Convention of the American Paper and Pulp Association is a fitting time to make some comments on the growth and importance of trade associations in general and the American Paper and Pulp Association in particular.

These comments with some brief remarks on business conditions, past and present, and a briefer glance at the future, will comprise what our Secretary has chosen to designate on the program "The President's Address."

I wish to pause here long enough to pay a tribute to my predecessor in office, Mr. George W. Sisson, Jr. His administration will long be remembered by the very able, annual addresses he delivered. They rose to the rank of real state papers. I commend particularly to your careful re-reading his address delivered one year ago.

The ability to organize into groups for political and social betterment, marks the difference between the human animal and the lower forms of animal life. Almost as far back as the beginning of written history there are evidence of trade associations. You will recall that the Apostle Paul had trouble with the Silversmith's Craft of Ephesus, and their leader, one Demetrius, proposed to silence him, charging that his teaching hindered the sale of their product. This was at the very opening of the Christian era.

Medieval Europe saw the rise and fall of the Guild System, and now in these latter days we are witnessing a very important development in National Trade Organizations.

There are at the present time about one thousand trade organizations in the United States. Approximately two hundred of these are national in their scope and activities. This large growth is strong evidence that the modern business man has at last learned that *co-operation* and not *competition* is the real life of trade. Mr. Emmet Hay Naylor in his recently published book on Trade Associations states this very clearly as follows:

"The modern trade association is one result of the business world's realization that unrestricted competition is unnatural and fallacious and that constructive, intelligent competition, together with studied co-operation, is not only desirable but essential to industrial welfare.—The old conception was that industrial success was built on the failure of others; the new conception is that every failure in an industry is felt disadvantageously by every member of that industry and by the consumer as well, and that the temporary profits enjoyed by the victor generally cannot offset the damage and retrogression suffered by the industry as a whole."

Co-operation of the right kind does not destroy healthy competition. It does on the contrary encourage fair competition by giving the business executive accurate knowledge of trade conditions. This knowledge he can use for constructive purposes in his own business without destroying the business of his neighbor. Someone has recently said that the modern business world needs

"Co-operation regulated and not competition compelled."

Large corporations or so-called "Trusts" are manifestations of man's desire to obtain the benefits of co-operation; the practices of some of them may have gone beyond the bounds of good morals or proper legal limits, but this fact of itself is not a valid argument against the principle of co-operation.

The importance of trade organizations and co-operative methods are being recognized in high places. Mr. Herbert Hoover, Secretary of Commerce, in his recent correspondence with Attorney General, Harry M. Daugherty, said,

"It is with earnestness that I claim there is propriety, generally speaking, in trade associations. Their lawful field of endeavor is large, and their activities work for promotion and advancement of the public welfare and for progressive economic organizations."

Mr. Justice Brandies and Mr. Justice McKena in their Dissenting Opinion on the Hardwood Lumber case, said,

"Intelligent conduct of business implies not only knowledge of trade facts but an understanding of them. To this understanding editorial comment and free discussion of those engaged in the business and by others interested are aids. Opinions expressed may be unsound; predictions may be unfounded; but there is nothing in the Sherman Law which should limit freedom of discussion, even among traders."

This dissenting opinion was concurred in by Mr. Justice Holmes.

In my opinion the development of trade organizations along proper lines has been a great step in advance and points the way toward the proper use of the principles of co-operation, in contrast to the old pools and trusts. As the Reserve Bank System, by creating co-operation among the individual banks, prevented a financial panic, so I believe the national trade associations, by encouraging co-operation among their members, have prevented industrial disaster.

The American Paper and Pulp Association has kept pace with the modern development of the organization idea. Organized in 1878 it has had a long and useful career. There are only three older national associations. It is interesting to know that the oldest trade association in the United States is the Writing Paper Manufacturers Association, which was organized in 1861. The American Paper and Pulp Association's form of organization has changed as conditions have changed, which is an evidence of life and growth. In its present form it is a federation of twenty affiliated associations, and sections, each active in its own field, but all working together on larger general matters. As conditions change, the form of organization should continue to change.

Mr. Sisson, in his address last year, suggested that a committee be appointed to study the present form of organization and suggest improvements. This committee was appointed and will report today certain changes that we believe will strengthen the organization. The changes have been thought out very carefully and ought to have your approval. The American Paper and Pulp Association desires, and we believe deserves, the hearty support of every manufacturer of paper and paper products.

Business Conditions

It would serve no good purpose to go over in detail the history of the last year and the year before. It is sufficient to say that they were the two worst years the paper industry has seen in a generation, but they are behind us and we can look forward to the future with courage unimpaired. It has been a source of great satisfaction to me that I could occupy the office of president during one of these trying years. It has brought me into intimate relations with many of you who have been bravely bearing the burden and heat of the day. Surely the men of the paper industry are good losers. I have seen men facing large losses from month to month with stout hearts and smiling optimism, and never a one who was really discouraged or disheartened. I have come to think of these years as years of gain instead of loss. After all, it is not the greatest success to make much money, the real success is the building of character. What does it count if we have lost a few dollars; we have gained courage, hopeful optimism, confidence in ourselves and in our association. These are the things that enrich life. Ruskin once said that,

"A hundred men can talk where one can think. A thousand men can think where one can see. To see clearly is poetry, art and religion."

He might well have added:

"To see clearly and act courageously are the two essential principles of a successful businessman's life."

These years have proven that we have many men of this character in the paper industry.

There are great signs of encouragement for the future. Building is starting up in many centres. Non-employment is decreasing. Railroads are increasing their earnings, and are coming into the market for new equipment. The price of agricultural products is advancing, thus increasing the buying power of a large part of the population. The steel business has steadily improved and is now on a basis of 75% tonnage, which is more than equal to 100% product before the war. Foreign exchange is improving. The banks are in good condition, so that money is available for new enterprises.

Our own industry has been thoroughly liquidated, both as

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to costs and selling prices. Stocks are low in the hands of merchants, printers, and the public. The mills at present are receiving orders at the rate of fully seventy-five per cent of normal capacity, all of which is being consumed. A small movement all along the line to build up stocks would soon put the mills onto a one hundred per cent basis. This is bound to come in the near future. So let us forget the things that are behind and press forward with courage to the better things before, with full confidence in ourselves, our associates, and our associations.

Dr. Hugh P. Baker, executive secretary and treasurer of the American Paper and Pulp Association, reported as follows:

Secretary-Treasurer Baker's Report

As with other trade associations throughout the country, this association has reflected the depressed business conditions. The officers of the association have made consistent and constant effort to economize in expenditures, and, at the same time, to make the association serve the industry more effectively.

Future possibilities in trade association work are indicated by the way in which associations have continued to receive the support of industry even when many of their own activities have been cut down or eliminated by the manufacturer. If there has ever been a time when trade associations could be of service to the manufacturer it has been in these months of difficult business conditions. In the older associations of the industry, where the possibilities of association work have been thoroughly appreciated, there has been even more interest in association work than during the abnormally good times of eighteen months ago. It is hoped and believed that the experiences of manufacturers in associations during the difficult year just passed will make for a stronger working together of all the elements of the industry.

There are a few organizations of men where a 100 per cent. membership means as much as in a trade organization. The value of the work of the association is affected pretty largely by the ability of an association to turn out accurate and complete statistics as to production, shipments, stocks, etc., covering all of the manufacturers represented by that group. Furthermore, a 100 per cent. membership reduces the average expense for all.

When your secretary came into the association two years ago he attempted to analyze the activities of the association and the opportunities ahead, and he felt that one of the first activities should be an aggressive membership campaign. Such a campaign was laid out on paper, but as the plan developed it was seen that the association was somewhat too indefinite in its service, and possibly had too little of direct service to sell. Therefore the idea of an aggressive campaign was laid aside temporarily and every effort has been made the past two years to develop the effectiveness of the service of the association. Two new activities have been added to the association which have very large promise in the way of direct service. These are the Woodlands Section and the Information Service, both of which will be mentioned later.

In the way of direct service the association has greatly strengthened its contact with the Federal Government and with State legislatures. It has also gotten in much closer touch with other national associations of manufacturers, largely for the purpose of profiting by the experiences of these other associations, but also that we might reflect more accurately to our membership those business activities outside of the paper industry which may have very great influence upon the paper industry. It is believed that the association, in its more effective co-ordination of the work of the Service Association, that is the Technical, Cost, Salesmen's and Superintendents' Association, with the more direct activities referred to above, is now in position to offer service to every paper manufacturer in the United States.

With your help it is planned, therefore, to begin at an early date an aggressive membership campaign which will bring non-member mills into their respective groups or directly into this association. Only with your help can this be done in any satisfactory way.

Work of the Committees

In the report of last year emphasis was laid upon the fact that the work of such an association as this must be carried on more or less through standing or special committees. A recommendation was made that there should not be the usual standing committees, but rather that when a certain piece of work was to be accomplished in the association there should be a special committee, which, upon the completion of the special piece of work, should be discharged. A considerable number of standing committees, presumably active upon different phases of work of the association, may make an excellent showing in a secretary's report. However, where a standing committee is in existence and where it is not definitely engaged in work for the association, there cannot help but be a feeling on the part of the members of that committee that if the committee itself is not actively at work that possibly the association is not at work.

Several very active special committees have been at work, some of them during most of the year. The tariff committee, of which Henry W. Stokes is chairman, has done a great deal of work and work of very distinct value to the industry.

The committee on forest conservation has continued its activities, and as Frank L. Moore, a past president of this association, is not now directly connected with the paper industry, George W. Sisson, Jr., past president of the association, accepted the chairmanship of that committee.

Two special committees have been appointed in connection with contact of the industry with Washington. The advisory committee from the paper industry for the paper section of the Bureau of Standards, which was appointed late last year, has been reorganized, with Arthur H. Nevisu as chairman, and has been representing the industry in a very careful way in such matters as classification of paper, standardization, and especially in the way of interpreting to the Bureau of Standards the problems confronting the paper industry.

Through the aggressive work of several of the advisory committee from the paper industry for the Bureau of Standards and others, Secretary of Commerce Hoover was interested in the development of a paper commodity division in the Bureau of Foreign and Domestic Commerce. The development of this division and the selection of a man as chief was a slow, difficult problem, but it has finally worked out in a very satisfactory way. To support and assist in the work of the paper commodity division, a very representative committee on co-operation with the Department of Commerce has been appointed. The membership of this committee is not confined to members of this association, as it was Mr. Hoover's wish that the committee represent the entire industry. This committee met with Mr. Hoover; Dr. Klein, Chief of the Bureau of Foreign and Domestic Commerce, and with Mr. Jones, Chief of the Paper Division, early in the year. Normal W. Wilson, a member of the committee, will report at this meeting upon the activities of the committee.

The Woodlands Section

At the time of the first fall conference in Chicago a suggestive plan for special educational work by the association was presented through the president. This plan, outlined as informational service, to be carried on in the association for the purpose of securing informative material as to the industry, to distribute this material to members of the association and to the public, where such distribution would appear to help the industry. The plan was accepted and upon its presentation to members of the association a special fund of approximately $7,500 was raised for the carrying on of the first year's work. Mr. W. B. Bullock, a trained newspaper man, was placed in charge of the service and a year of the activities of this service have proven the value of the educational or publicity service for the industry. The activities of the association and of the industry as a whole have been taken to the public through magazine articles and through the daily press. A motion picture film and lantern slide service has been developed and the demands for films and slides are simply beyond all possibility of satisfaction. It is difficult to measure the value of a piece of work of this kind in dollars and cents—just as it is difficult to say definitely what the value of educational activities generally are. Those who have followed the work of this service carefully are enthusiastic as to the possibilities of such work for the future.

The woodlands section was organized in 1920 for the purpose of bringing together the companies and the men in these companies having to do with the handling of forest property. This section has an individual membership of woods managers, purchasing agents and foresters of about seventy. Several meetings have been held where programs of very real interest to the industry have been presented. The general program which is in your hands will indicate the vital character of the discussions which have taken place at the meeting of this section on Tuesday of this week.

For the first time in its long life the association, through this section, is making a serious effort to procure accurate statistics as to the wood situation as affecting the paper industry. Wood is the raw material of a very large part of the industry and it is very important that we should have information, and more, accurate statistics, as to the available supplies of wood; how much is being cut from year to year; how much wood is in the yards. We should know the wood situation in Canada and other countries from which we secure

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considerable quantities of pulp. O. M. Porter, the assistant secretary of the association, has had the entire development of this section in his hands and he has done an excellent piece of work.

It is along these lines that the woodlands section can probably be of most direct service to the members of the association, since its objects are specifically:

1. To increase the efficiency of the woods operations of the pulp and paper industry.
2. To encourage the practice of forestry on timber land holdings.
3. To provide a medium for the gathering and dissemination of information which will promote the permanency of woods operations of the pulp and paper industry.

It is surprising at times to have a paper manufacturer ask why he should be interested in the forests of this country and Canada and in the practice of forestry. When in such paper manufacturing centers as Holyoke or Kalamazoo several hundred tons of pulp are being used daily to produce three or four or five hundred tons of paper, it is difficult to understand why there should not be an increasing interest in the entire industry in the question of a permanent supply of wood for the industry. The price of wood and pulp will continue to increase with the passing years, and largely because no attention is being paid to maintaining the permanency of the forests from which this wood and pulp are coming.

Information Service

In describing the activities of a federated association, such as the American Paper and Pulp Association, it means but little to report that we have had so many meetings and that we have gotten out so many publications. Numbers of meetings held and publications put out by an association may or may not mean a great deal in the work of that association or in its service to an industry. Where meetings or publications are needed the association is trying to respond to the need and to arrange for meetings in an effective way and to put out publications of timely interest and help.

The fall business conference in Chicago has become a fixed occasion in the activities of the association. The bringing together of all elements of the industry in a fall conference in Chicago, and especially such discussion of conditions in the industry as took place last fall are making for a better understanding of the times and a better appreciation of the desirability of all elements of the industry working together for the common good of all. The fourth fall business conference will be held in Chicago on October 19, 1922.

The monthly bulletin of the association has been continued since it was started in June, 1920. It is not read by all the members of the association any more than that any of us read all of the daily papers or magazines or bank reports which come across our desks or tables. We are making a strenuous effort to take out through the Bulletin each month the work of the association to our members and we are hoping that gradually we may make the Bulletin tell more effectively the story of conditions in the paper industry and that in a way that it will cause the statements to be quoted in letters from the reserve and other banks of the country. That is, we want to make the bulletin of assistance to paper manufacturers directly and indirectly. There have been special publications put out by the association from time to time through the year on the coal situation, in tariff matters and along other lines.

Contact with Legislation Committees at Washington

Through the years it seems to have become almost a sport of the business men of this country to criticize the Federal and State governments for what they do and for what they do not do. All too often there is good reason for criticism, though when the Government does actually attempt to give effective service there has not been commendation of its service but rather a grudging acceptance of it. The tendency in the development of government in this country in the past sixty years has been toward stronger municipal and Federal Government and weaker county and state governments. The Federal Government will continue with passing years to take greater cognizance of economic and business conditions, and there is every reason for more effective co-operation on the part of the business man with the Federal Government and mighty little arguments against such co-operation. When the Federal Government, through tariff and tax laws, can pretty nearly control the success of business, it would appear that manufacturers and business men generally must come together to work actively with all departments of the government at Washington.

The association during the past year has made very definite effort to bring the paper industry into the right kind of contact with committees drafting legislation, and with the departments carrying out laws already in existence. The committees referred to above on Co-operation with the Bureau of Standards of the Department of Commerce and on Co-operation Directly with the Department of Commerce, have made a beginning in taking to the departments in Washington the problems and the needs of the industry.

It is furthest from the thought of your secretary or of these committees, to be running to Washington with every little problem that comes up in the industry or to indicate that any association in the industry is on the defensive in any way. On the contrary, the dignified and effective way in which the Tariff Committee presented the needs of the industry to the Ways and Means Committee of the House and the Senate Finance Committee has made for a much better understanding on the part of those committees of the paper industry, and has placed the association and the industry itself on a much better plane in the minds of those having to do with legislation at Washington.

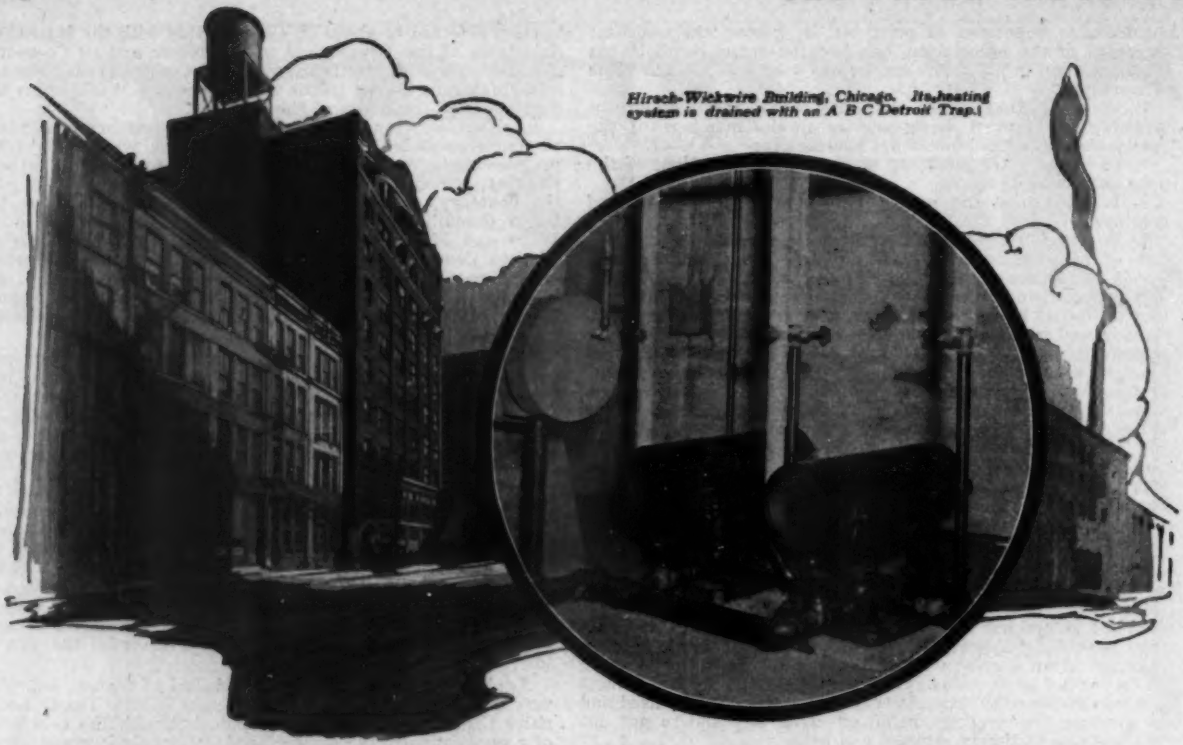
Much too often in the past this association has been very active in the preparation of certain legislation and then in a surprising way has concluded that the work has been completed and have not interested themselves in the carrying out of such legislation. We have spent a good deal of time and money in the preparation of statements as to what we want in the way of tariff legislation. This would appear to be but half the job, since we are paying almost no attention to the way in which the tariff laws are being applied. Great quantities of paper are being brought into this country under improper classification, and, of course, to the detriment of the paper industry. The industry should have a man who understands thoroughly the importation of paper, who could keep close touch with the larger ports, to see that paper is brought in under right classification and to secure information as to importations. Such work cannot be done with the present force of this association.

Again, the industry spent a good deal of money, and did a very effective piece of work through the Income Tax Questionnaire Committee of the association, but with the completion of a questionnaire the work ceased, and again it would appear that we have gone but half way in the undertaking. Just as the Cost Association of the Paper Industry is doing very effective general educational work along cost lines, so the industry should have a tax expert to do educational work in the industry along tax lines. Such a man should keep in close touch with the Income Tax Bureau at Washington to see that adverse rulings are not put out through ignorance of bureau officials as to the paper industry. This same man could visit the different paper making regions, not to assist each mill in the making out of returns, but rather to discuss in the different sections, or with the different mills, the rulings being put out by the Income Tax Bureau, explaining carefully the application of obsolescence, depreciation and other phases of the Income Tax Law. There is no question but what the industry has lost thousands of dollars by the companies failing to take advantage of exemptions under the law, which would come from a proper understanding of obsolescence, depreciation and similar technicalities of the law.

Your Secretary, in referring to the failure of the industry to carry these activities through to completion, is not seeking to build up a larger organization in the Association. He feels, however, that he should point out as a matter of protection to the industry what it would appear can be done to very great advantage. Other industries are protecting themselves in the similar ways and the paper industry must protect itself, if it is to prosper, in what would appear to be a considerable period of declining prices ahead of us.

Your Secretary has just passed his second year with the Association. Working as he is with a federated organization, he cannot get particularly close to the manufacturers who make up the affiliated associations. He appreciates most thoroughly the kindly and generous support given at all times by the President. Few members of the Association appreciate how much time is demanded by the Association of the President. The way in which the industry has accepted what your Secretary has been trying to do the past two years has meant a great deal in his becoming established in your work. It is very reasonable for you to expect more effective work the coming year, and with your continued interest there will be more effective work.

Your Secretary appreciates very keenly the spirit of friendliness and the support extended him by members of the Executive Committee of the Association, the secretaries of affiliated associations, his associates in the Association and the members generally. After all, the Association, like any organization of men, is what the members make it. The Secretary can but assist. Because he believes tremendously in the industry and in you men who make up the industry, he has confidence that he can assist. How much that assistance will mean to the



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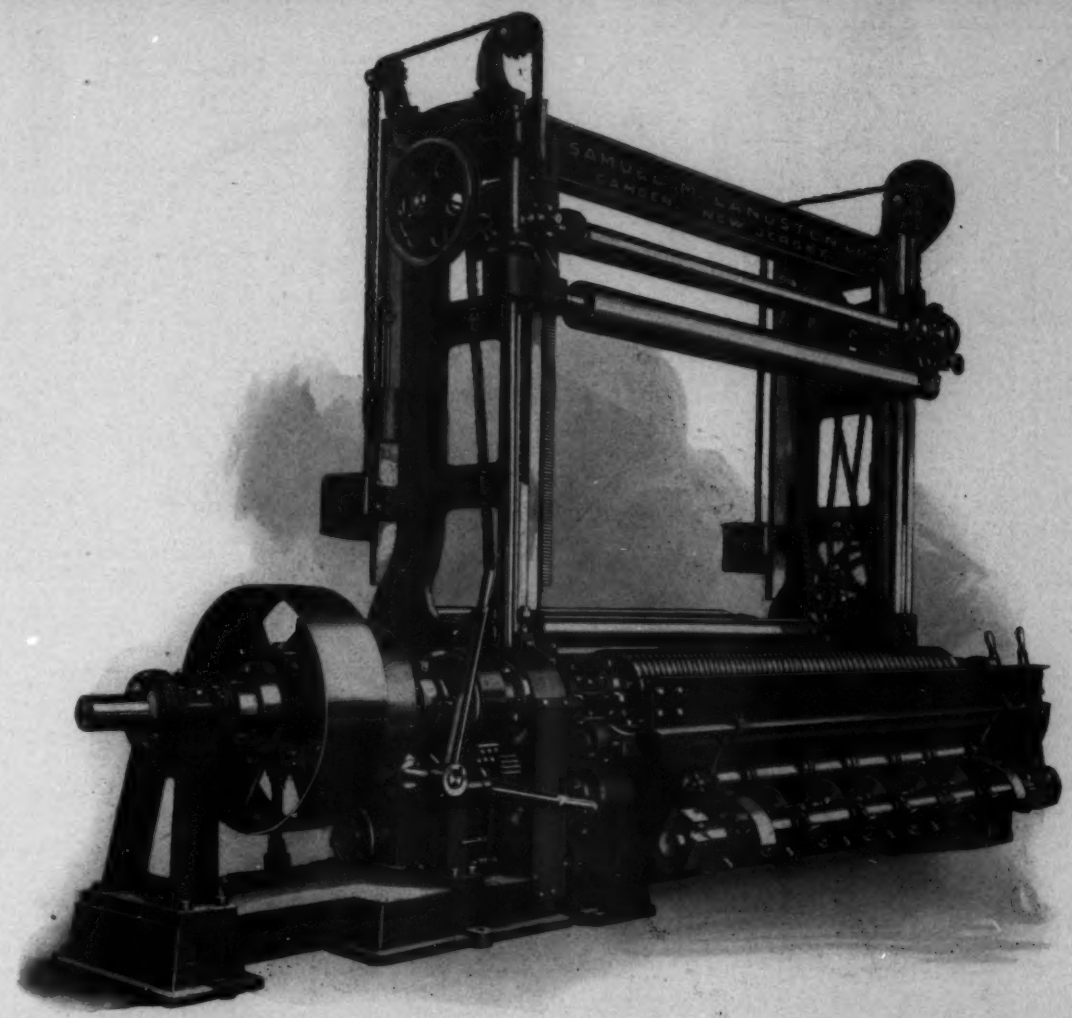

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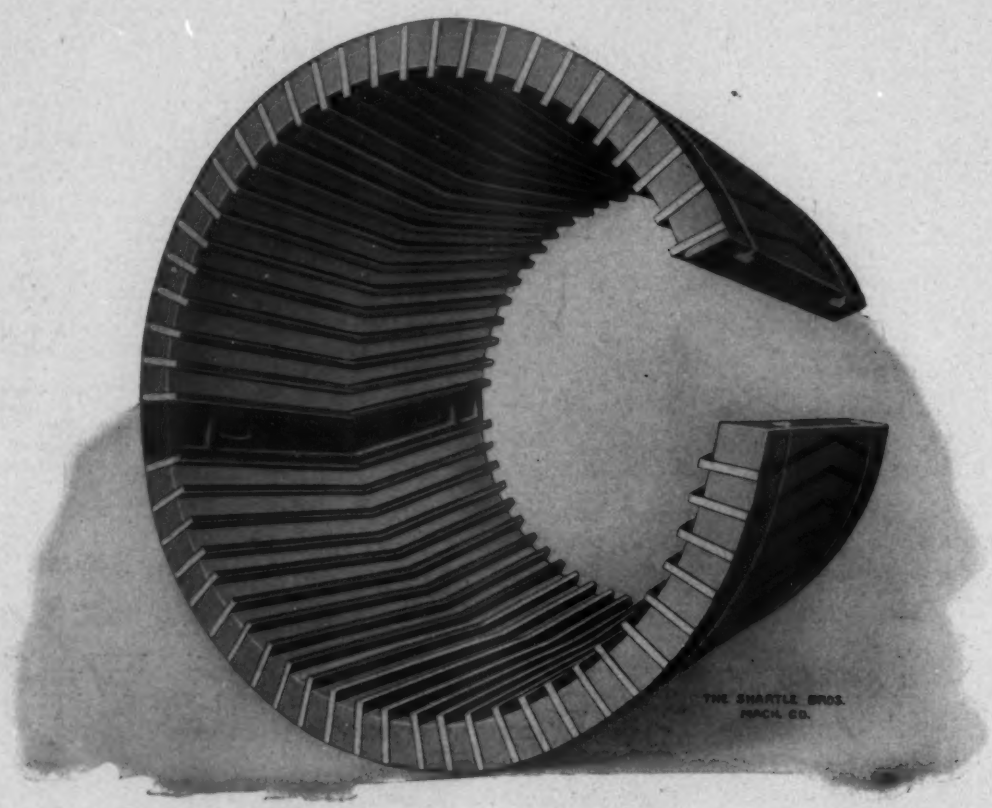

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Association will depend entirely upon the way in which you meet not only the Secretary but your President, and your Executive Committee, in the work which they are trying to do.

Conditions in the Paper Industry

It is becoming a regular feature of the annual meetings of the American Paper and Pulp Association to have Philip T. Dodge, president of the International Paper Company, the largest news print producing organization in the country, to make a few remarks on conditions in the print paper trade—the basic branch of the paper manufacturing industry. Mr. Dodge reviewed in a highly interesting manner the situation in news print during the past two years, and emphasized that overproduction in 1920 was largely to blame for the resultant unfavorable conditions prevailing last year in the print paper industry. He stated, however, that the industry at present is in a far healthier state, that consumption of print paper is increasing steadily, and that there is every possibility that the United States export trade in news print paper will soon revive as exchange on foreign countries—which has been the principal deterrent factor in keeping exportations of print paper from the United States on a small scale—is gradually reaching nearer normal levels.

Mr. Dodge also dwelled on the labor situation at much length, mentioning the difficulty which the International Paper Company was occasioned last year because of an unwarranted strike of its mill operatives. He outlined how his company had succeeded in replacing the striking workmen with non-union men, and stated that his company was now operating its plants "on the American plan" of dealing direct with its employees. Much applause greeted his statement that as long as he remained president of the International Paper Company no union leader "will be allowed to put his foot in the mills of the company." He declared that under the new labor arrangement his company was obtaining larger production with fewer workmen, and stated that he was thoroughly "opposed to intervention of any third party"—governmental or otherwise—in the dealings between officials and employees of his company. Mr. Dodge closed his talk by urging co-operation among paper manufacturers, and entreating his fellow manufacturers to "hold their heads" during these trying times. As illustrating the improvement that has occurred in the print paper industry, he said that consumption of news print in the United States in 1921 had increased between 6 and 7 per cent over that in the preceding year.

C. A. Crocker, of the Crocker-McElwain Company, Holyoke, Mass., was scheduled on the program to give a short address on prevailing conditions in the fine paper industry, but as Mr. Crocker was called home suddenly by a death in his family, Col. B. A. Franklin, vice-president of the Strathmore Paper Company, of Mittineague, Mass., spoke in his place. Col. Franklin said that a happy faculty of the average American business man was his ability to start at the bottom and build up during a period of poor times, and stated that it was this ability that had served to bring the fine paper branch of the United States paper manufacturing industry out of the chaos that existed early last year until now the fine paper mills of the country are well on the road to prosperity. He cited figures showing that average orders for writing papers during the first quarter of 1921 were only 29 per cent of mill capacity, whereas today and since the first of this year orders have averaged 79 per cent of mill capacity, which, he stated, using the vernacular, "is saying a mouthful." Col. Franklin said that prices on fine papers were rapidly reaching a full degree of stability; that the fine paper trade was well organized, and that the fine paper manufacturers of the country were well organized, and that the fine paper manufacturers of the country were particularly fortunate in having as their direct customers a large body of merchants of very high character who have maintained their financial soundness during all the period of deflation and uncertainty. He remarked that the printing industry—the chief consumer of fine papers—had not yet liquidated in proportion to other industries, and that the high cost of printing was still limiting the consumption of fine paper. He said that fine paper manufacturers had learned one very important lesson in recent months—that to restore prosperous conditions it was necessary to get back to the old fundamental methods of conducting business, to get over the "drunk" of the unhealthy period of activity in 1920, to create stability and to work—"work just as hard and as long as our fathers did."

Reports of Committees

Following the talks by Mr. Dodge and Col. Franklin, reports of the committees were called for. Henry W. Stokes, of the York Haven Paper Company, York Haven, Pa., chairman of the Tariff Committee, rendered the following report on behalf of that committee:

Tariff Committee

Henry W. Stokes, of the York Haven Paper Company, Philadelphia, chairman of the Tariff Committee, rendered the report for that committee, as follows:

"The report of your Tariff Committee presented last year covered what had been done up to February 5th, at which time the briefs of the different divisions with their recommendations had been presented to the Ways and Means Committee of the House of Representatives. After several months' delay the Fordney Bill was finally prepared and passed by the House. In the opinion of most manufacturers the rates of duty contained in the Bill did not afford adequate protection and were not in line with what your Committee had been led to believe would be incorporated in the Bill. These rates were based on the American Valuation Plan—a new departure in our tariff legislation. After giving the probable effect of the results on the basis of the American Valuation, the rates were not as high as those the industry formerly received under the Payne-Aldrich Bill of 1909. It is not necessary to go into a detailed statement of the rates provided for the various grades of paper, as these are now a matter of record and familiar to the manufacturers interested.

"Opportunity to present our case before the Finance Committee of the Senate was offered on December 21st, at which time your Committee and other interested members appeared and filed supplementary briefs containing arguments to show why the rates provided in the Fordney Bill were inadequate. These are now before the Committee for their consideration, but completed schedules have not yet been reported by that Committee to the Senate. The Committee believe that the Senate will increase the rates afforded in the Fordney Bill and are encouraged in this from the fact that the chairman of the sub-committee of the Ways and Means Committee having the preparation of our schedules has not objected to the changes which were asked for before the Finance Committee.

"It is impossible to state when the new Tariff Bill will be made into law, but it is doubtful whether it will be enacted before mid-summer.

"The expenses of the Committee have been moderate and have been borne by the different divisions of the Association."

George W. Sisson, Jr., of the Racquette River Paper Company, Potsdam, N. Y., read the following report for the Committee on Forest Conservation, of which he is chairman:

Forest Conservation Committee

On behalf of the Committee on Forest Conservation, George W. Sisson, Jr., of the Racquette River Paper Company, Potsdam, N. Y., and former president of the American Paper and Pulp Association, read the following report:

"The relation of forestry to the paper industry is being daily realized as more and more vital. With the great sums involved in paper manufacturing plant investments, the paper industry is willing to do more than its share toward providing a future supply of raw material. In the last analysis the problem of the nation's paper supply is the problem of its timber supply.

"The study of measures of temporary relief as well as of long time policy for guarantee of the future has now been well started and should be continued as one of the fundamental activities of this Association.

"In its report to the American Paper and Pulp Association on November 14, 1919, your Committee set up a program of forest conservation and utilization designed to be adequate for the purpose intended, just to the interests concerned and practicable in method of accomplishment. This report was unanimously approved by the Association as was a further report of more specific character presented at the annual meeting on April 15, 1920.

"It is a matter of congratulation that the initiative and leadership of your Association has met with the widespread approval by practically all interests that have given particular attention to forestry matters in the past but who had not been able up to that time to find common ground for practical and sensible co-operation.

"With these two reports approved by you as its charter, with a definite legislative program in which other influential organizations are actively co-operating, and with the steady support of the officers of your Association, our efforts have been constantly directed toward the enactment of the legislation, National and State, which will make possible the maintenance of our timber supply. A bill which was the best consensus of opinion of our committee of the lumber manufacturers and timberland owners and the users of forest products

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was introduced in the 66th Congress by Representative Snell on December 22, 1920. Brief hearings were held upon it by the Committee on Agriculture on January 26-27, 1921, but no further action taken since that Congress expired by limitation on March 4, 1921.

"The Bill was again introduced by Mr. Snell in the Special Session of the 67th Congress on April 11, 1921 and a similar bill was introduced in the Senate by Senator McCormick of Illinois on May 23, 1921. The proposed legislation will, therefore, be part of the unfinished business for the House Committee on Agriculture and the Senate Committee on Agriculture and Forestry until some action is taken or the 67th Congress terminates on March 4, 1923.

The Senate Committee has not as yet held any hearings on the proposed legislation. The House Committee, however, held very complete hearings upon the Snell bill covering all phases of it and arguments for and against on the four days, beginning January 9, 1922. The volume of evidence presented and discussion indulged in is shown by the fact that the report of the hearing contains 260 pages in small type.

"Without doubt this hearing was the most comprehensive one ever held by a Committee of Congress upon the question of a National Forestry Policy. It was participated in by the chief forester, by other foresters of high standing, by representatives of state forestry departments, lumber manufacturers and timberland owners and by spokesmen for the newspaper publishers and the users of forest products. Those who spoke in favor of the basic principle of federal leadership and co-operation with the states and timberland owners in the solution of the problem were allowed three days for the presentation of their evidence and arguments. Those who wished to oppose the provisions of the bill took less than one day although more time was reserved for them had they appeared to occupy it. The chief opponent of the bill, as at the previous hearing, was the Forest Commissioner of Pennsylvania whose arguments were of a political character and who is now a candidate for the Governorship of that State.

"It is a conservative statement to say that a large majority of the foresters, the lumbermen and timberland owners and the users of forest products who are in favor of any constructive legislation whatever believe that the basic principle of the Snell bill is the best one upon which to build a practical program for an adequate and permanent timber supply.

"The next move is up to the Committee on Agriculture of the House of Representatives. We have presented our plan and made our case. If the Committee does nothing and the bill dies on April 4, 1923, it will be introduced in the next Congress and the fight continued. Congress unhesitatingly exceeds the budget and makes appropriations in excess of revenues where votes next November are supposed to be involved, but pleads economy and refuses to act on measures of permanent welfare whose proponents have no mercenary interest in their results.

"The appropriations asked for in order to make a beginning on a broad national forestry program are insignificant in comparison with the amounts that are wasted by Congress for unworthy purposes. Even though the enactment of forestry legislation may not be secured during the present Congress, there is no reason why the Committee on Agriculture should not make a start in working out the problem through a study of the evidence presented and the re-writing of the bill in such fashion as it thinks necessary.

"The greatest assistance that the members of this Association can give to our efforts at this time is for everyone of them individually to tell their respective members of Congress and likewise the members of the Committee on Agriculture that the pulp and paper industry is in earnest about this matter; that the problem is a serious one; that we do not intend to let up until a start has been made toward its accomplishment and that failure to act at this time will but result in new and greater demands for action the next time."

G. M. Jones Speaks on Foreign and Domestic Commerce

President Raybold then called on Grosvenor M. Jones, chief of the Paper Division of the Bureau of Foreign and Domestic Commerce, to speak. Mr. Jones outlined the work that his Government bureau is endeavoring to do on behalf of the paper manufacturers of the country, and mentioned the broad-minded policy being followed by Herbert Hoover, Secretary of the Department of Commerce, in an attempt to build up the foreign trade of the United States and in his efforts to bring the Government nearer to the business men of the nation and to make the governmental agencies and departments of benefit to the business interests of the country. He said that the Bureau of Foreign and Domestic Commerce is being thoroughly reorganized along industrial lines, that the Paper Division of the bureau is organizing its files and data to be of better service to paper manufacturers and exporters, and asked for the hearty co-operation of the paper industry in the aims of himself and Mr. Hoover in this direction. He cited statistics showing that exports of paper of all kinds before the war averaged in value about $10,000,000 a year; that in 1919 the high water mark of paper exports from the United States reached $70,000,000, representing approximately 7 per cent of the total product of American mills, and that in the past two years paper exports had receded to a value of about $30,000,000. It is the hope of his bureau, he stated, to help the paper manufacturers of the country bring exportations of paper back to the high level of three years ago. He also outlined the work which his bureau is attempting to do in providing detail data on economic conditions in the various foreign countries, and stated that in the near future direct cable advices regarding paper industry conditions particularly in the paper-producing countries such as Scandinavia and Germany would be received by the bureau and immediately disseminated among paper manufacturing interests throughout the United States.

Norman W. Wilson, of the Hammermill Paper Company, Erie, Pa., chairman of the Committee on Co-operation with the Department of Commerce, rendered the following report on behalf of that committee:

Committee on Co-operation with Department of Commerce

The Advisory Committee representing the paper industry which visited Washington January 30, and 31 to call upon Secretary of Agriculture Wallace, to confer with Secretary Hoover and other officials of the Department of Commerce, and to meet the officials of the National Chamber of Commerce consisted of Messrs. Philip Kimball, Liberty Paper Co., New York City; James Logan, U. S. Envelope Co., Springfield, Mass.; Chester W. Lyman, International Paper Co., New York City; C. R. McMillan, Union Bag & Paper Co., New York City; George E. Nelson, West Virginia Pulp & Paper Co., West Carrollton, Ohio; George W. Sisson, Jr. Racquette River Paper Co., Potsdam, N. Y.; Arthur H. Nevius, Miami Paper Co., West Carrollton, Ohio; Louis T. Stevenson, Mountain Mill Paper Co., Lee, Mass.; N. W. Wilson, Hammermill Paper Co., Erie, Pa.; W. F. Brunner, Paterson Parchment Paper Co., Passaic, N. J.; Walter J. Raybold, B. D. Rising Paper Company, Housatonic, Mass., President of the American Paper and Pulp Association and chairman of the committee, and Dr. Hugh P. Baker, Executive Secretary of the Association.

All were present with the exception of Mr. Sisson and Mr. Brunner.

The call upon Secretary Wallace was to attempt to place before him the Paper Industry's conception of the importance of forest conservation and the establishment of a definite and substantial program for reforestation, in order to maintain, within this country, at least a substantial percentage of the supply of wood necessary to our and other wood using industries. We also wanted to learn the Secretary's attitude in connection with the proposal to remove the control of work of this nature from the Department of Agriculture and place it under the jurisdiction of the Department of the Interior.

Secretary Wallace met us most cordially and after discussing various phases of the consumption of domestic and the importation of foreign timber, he assured us that he fully recognized the need for an intelligent and effective program to protect our present forests and to renew them as rapidly as possible. He expressed himself as strongly opposed, from a practical standpoint, to a removal of the control and direction of this work from the Department of Agriculture.

We assured him of the desire of the Paper Industry to co-operate just as far as possible with any practical forestry program which would be adopted and to support the Department of Agriculture in any way that we could in their effort to continue the direction of this work.

The Committee next called upon Mr. Defrees, President of the Chamber of Commerce of the United States, Vice-President Goodwin and Acting Secretary Skinner.

Mr. Defrees explained how in 1912, at the invitation of the President of the United States and the then Secretary of Commerce and Labor, over five hundred representatives from commercial organizations throughout the country met in Washington and laid the foundation for what has since become one of the strongest business organizations of the world, organized for the purpose of serving business by encouraging commerce within the United States and with foreign countries.

The organization membership in the Chamber today numbers over 1,400 with a membership of over 800,000 corporations, firms and individuals.

The two main functions of the Chamber are:

1. The obtaining of the mature judgment of American

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business on national questions and obtaining fair consideration by our National Government of these views.

2. A study of national and territorial business conditions, the results of which are reported in printed form by letter and telegram to the membership. The preparation of referenda with the distinct purpose of bringing out both sides of various questions were described.

Mr. Defrees, Mr. Goodwin and Mr. Skinner described the activities of the different Divisions and later took us through their entire business plant. The Committee felt that the interview was well worth while and believes that it succeeded in conveying to the main executives of the Chamber a better conception of the importance and magnitude of the Paper Industry and of the Organization which represents it.

At the outset of the Conference with the Department of Commerce, the Department was represented by, Dr. Julius Klein, Director, Bureau of Foreign & Domestic Commerce and Messrs. Grosvenor M. Jones, Chief of the Paper Division, Constant Southworth, Paper Division, Alex. G. Goldsmith, Western European Division, Edward T. Pichard, Chief, Textile Division.

Dr. Klein, Director, describing the development of the Commodity Divisions, said they grew out of the English idea of development of organization for promotion of foreign trade. Dr. Klein emphasized the idea that 'commodity men,' whose headquarters are at Washington, do not remain continually in Washington but rather make frequent trips into the domestic field to learn just what American manufacturers want. It was further emphasized that the Bureau has a large staff of men in foreign countries and the plan is to send additional experienced and capable men abroad, where necessary, to get information needed in the development of American trade.

Dr. Klein stated that the Consular Service has been much improved and that all commercial and economic information coming to the Department of State, is forwarded immediately to the Department of Commerce. However, the American Consuls give a good deal of their time to non-commercial activities. They are furthermore tied to one city. The Commercial Attaches, sent out by the Department of Commerce, move about, thereby getting in contact with business activities.

Dr. Klein referred to the activities of the Regional Division and Mr. Goldsmith of the Western European Regional Division, told of his work in investigating general economic conditions, banking facilities, commercial law, etc. in different countries.

At this point Secretary Hoover came into the conference and spoke vigorously and to the point regarding the factors which were preventing a return to normal business. He referred to the spread between the price of American commodities as they leave the producer and as finally sold to the consumer. The factors making up this spread, he described as taxation, transportation, waste in industry and efficiency. He stated that increased taxation made up 10 to 15% of the spread and that increased freight rates represented about 15% of the spread. He startled us by stating that increased railroad rates had added $3,000,000,000 to the cost of production and distribution.

He emphasized the necessity of reducing the cost of producing finished goods and the spread between the price charged by the manufacturer and the price to the final consumer. He also emphasized that efficiency can be increased by national co-operation among industries and said that it may be advisable to bring about legislative change as to restraint of trade.

Mr. Hoover then stated that the Department had invited us to come to Washington, particularly for the purpose of assisting the Department in the effort to reduce the spread. He suggested that we might well make a study, within the Industry, and perhaps aim particularly toward what he described as a more effective combination between the Manufacturer and the Merchant.

Mr. Hoover agrees that every effort should be made toward simplification in manufacturing, but that a still bigger reduction of our final cost may be obtained by closer co-operation between the manufacturer and the merchant.

Mr. Raybold, as Chairman, discussed with Dr. Klein the question as to how our Committee might co-operate more effectively with the Bureau of Foreign and Domestic Commerce and especially with Mr. Jones, Chief of the Paper Division.

Dr. Klein recommended that the Committee keep informed of problems of the Industry and that a few of the committee be designated as a steering committee to aid Mr. Jones in getting quick action when necessary. Mr. Raybold pointed out the great diversity of Groups in the Paper Industry and showed the difficulty of attempting to select a small steering committee that would represent the whole Industry. It was, therefore, determined to take no immediate action regarding a smaller committee.

Mr. McMillan then pointed out the need for information regarding foreign markets and the kind of information that would be most helpful. Dr. Klein described the manner in which the Department can obtain up-to-date information in foreign fields and particularly what the Department can do in gathering trade statistics.

He told of a number of striking examples of the manner in which the Department had recently been able to co-operate with the American Industry; for instance, a short time ago the Cuban Government ordered all textiles then on hand in public warehouses sold at auction by a given date. A forced sale of this kind would have meant a tremendous loss to American Manufacturers. The Department, immediately dispatched two representatives to Havana and succeeded in having the order withdrawn.

Another case had to do with the merchandising of rice on the Pacific Coast. It seems that exporters and foreign buyers had represented to the American rice producers that unusually large crops of rice had come onto the market in the far East and that the value of the American crop was, therefore, badly depreciated. As a result a number of the producers, together with some large banking institutions on the Pacific Coast, were threatened with bankruptcy. The Department learned of the situation and within four days were able to show there existed no surplus of rice and that the crop report from the far East had apparently been distorted. The domestic market immediately strengthened and the threatened losses were prevented.

Dr. Klein related several instances where the Department had discovered attempts to pirate watermarks and brands for South America and how this piracy had been prevented by the Department. Mr. Jones then gave an outline of the work which the Paper Division proposes to carry out and described the assistance he would have from Mr. Goldsmith and Mr. Southworth. He urged that the Paper Industry regard him as their representative and to feel free to approach him upon any problem having to do with the Industry; in fact he made it clear that his work could only be justified and continued providing we sought his assistance on matters of commerce.

Perhaps the most significant and the most encouraging phase of the whole interview was the fact that all of the Officials of the Department frankly and convincingly took the position that they were in Washington for the purpose of serving the Commerce and the Industry of the United States. That they had no intention whatever of interfering with production and distribution but rather wanted to render assistance in problems of manufacturing and distribution, both in this country and abroad.

It should be a source of comfort to every business man of this country to know that we have at Washington a Department which recognizes its obligation to American Industry; a Department which recognizes that the backbone of the Nation's Welfare is the success of its Industries; a Department which understands the problems of the American business man and is using intelligent methods to cope with those problems. We all know the extraordinary accomplishments of Secretary Hoover, in charge of the entire work. Your Committee was wonderfully impressed with Dr. Klein, Director of the Bureau of Foreign and Domestic Commerce.

For the first time we now have a Division of that Bureau dealing specifically and entirely with the problems of the Paper Industry and asking only that we co-operate with them and make use of them. As a part of that Division you have a Committee willing to work.

Your Committee believe in the ability of Mr. Grosvenor Jones, Chief of the Paper Division, and feel that the ground work has been laid for practical assistance such as we have never previously had.

Advisory Committee for Paper Section of Bureau of Standards

A. H. Nevius, of the Miami Paper Company, West Carrollton, O., chairman of the Advisory Committee for the Paper Section of the Bureau of Standards, reported that his committee had made progress in assisting in an advisory way the Paper Section of the Bureau of Standards, and that a recent meeting of the committee and representatives of the Bureau had been held but that nothing definite had yet been accomplished. Another meeting, Mr. Nevius said, has been scheduled for the near future, at which paper standards and specifications will be gone more thoroughly into with the Bureau officials and at which it is expected some definite action will be taken.

Frank L. Stevens, of the Stevens and Thompson Paper Company, Middle Falls, N. Y., submitted his report as chairman of the Finance Committee. It will be noted that important changes are recommended by the Finance Committee in

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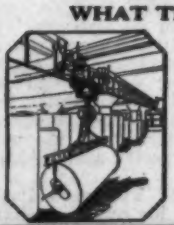

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the Articles of Organization of the American Paper and Pulp Association which will provide for a budget for the association and for handling the finances of the association on a more business-like basis than in the past. Mr. Stevens' report follows:

Finance Committee

The report, which is the result of a series of conferences, both of the Finance Committee and of the Executive Committee of the Association, in order to place the financing of the American Paper and Pulp Association upon a business-like basis that will be fair and equitable to all classes of membership, recommends that several paragraphs be added as Amendments to the Articles of Organization of the Association.

Reduced to non-technical phraseology, the proposed amendments provide as follows:

There shall be a Secretaries' Committee, composed of the Secretary of the American Paper and Pulp Association, and the Secretaries of affiliated and service associations, of which the President of the Association shall be chairman ex-officio. This committee shall meet regularly at the call of the American Paper and Pulp Association to discuss matters of general interest to the industry.

Members of affiliated associations are defacto members of the general organization. Active membership in the Service Associations, (Technical, Superintendents, Salesman's and Cost) is to be based upon active membership of the company with which the members are connected in the American Paper and Pulp Association. These service associations are brought closer to the American Paper and Pulp Association by making their secretaries, assistant secretaries of the parent association, whose secretary will have general supervision over the service associations in their contacts with it and each other.

For the fiscal year beginning April 1, 1922, the entire budget of these Service Associations shall be included with the budget of the parent association, so that all can be collected together, but the entire budget for each service association shall be turned over to the association for expenditure under the direction of its own executive committee.

All dues and assessments are to be collected through the affiliated associations, with the recommendation that the quota for the American Paper and Pulp Association be indicated to the membership of these associations.

The membership charge to mills is to consist of a flat minimum fee, together with an assessment based on an equitable combination of tonnage and value of product. The remainder of the report is devoted to examples of the manner in which this assessment will be worked out for the different groups of members.

The report is signed by the entire committee, consisting of Frank L. Stevens, chairman, Stevens & Thompson Paper Co.; Col. B. A. Franklin, Strathmore Paper Co.; J. H. Stannard, Grand Lake Co.; Frank L. Moore, Watertown, N. Y.; Frans B. Snyder, W. C. Hamilton & Sons; E. C. Betz, Consolidated Paper Co., and W. J. Raybold, B. D. Rising Paper Co.

On motion, the report of the Finance Committee was duly seconded and adopted.

Committee on Co-operation Between Associations

S. S. Rogers, of the Chemical Paper Mfg. Company, Holyoke, Mass., chairman of the Committee on Co-operation Between the American Paper and Pulp Association, the National Association of Waste Material Dealers, Inc., and the Association of American Wood Pulp Importers submitted the following report:

"Some months ago your president asked Grellett Collins, R. S. Hatch and myself to serve as a Committee on Co-operation, to meet at their request similar committees from the National Association of Waste Material Dealers, Inc., and the Association of American Wood Pulp Importers, to devise if possible some simple yet effective method for arbitration of differences.

"It was reconized that only infrequently was there need of such a plan, but, like a safety valve on a steam boiler, when it was needed it was needed very much.

"The courts are, of course, open for such cases, but if invoked are likely to be both dilatory and expensive—dilatory because neither judge nor jury are conversant with terminology and questions of fact and trade custom, and expensive because of attorney and witness fees.

"We agreed that some clear and well defined plan might be devised so that to court action would be unnecessary if perchance there was a serious difference of opinion as to contract obligations.

"Paper manufacturers have during the past few years come to recognize that hazy generalities too frequently lead to misunderstanding, and with this in mind have formulated through our divisions in agreement with the National Paper Trade Association clear-cut trade customs which we all agree have resulted in great good to the industry.

"In the same way practical customs have been formulated by other associations with whom we do business, notably the rag and waste paper classifications, all worked through in co-operation with the Waste Material Dealers' Association, and with advantage to all.

"It might not be out of place to indicate briefly that in furthering an arbitration plan we are keeping step with other bodies who are seeking to promote arbitration, notably the Chamber of Commerce of the State of New York, and a few years ago the establishment by the Chicago Association of Credit Men of a tribunal for arbitration of commercial disputes. The Chamber of Commerce of the United States and the Buenos Aires Chamber of Commerce have provided an arrangement for arbitration of similar disputes. The need for such as a matter of relief to our congested court calendars is apparent and it seems almost a patriotic duty to further any procedure that will permit the courts to attend more strictly and promptly to criminal cases.

"A preliminary conference at the association rooms resulted in substantial progress toward the suggested goal, and should work out a plan to submit to you (and a tentative draft has been formulated) it will be with the hope that thereby the cause of practical elementary justice will be furthered, and arbitration take the place of litigation."

After the Nominating Committee reported its list of nominations for officers of the association during the ensuing year, and the election was held, President Raybold in a few well chosen words thanked the members of the association for what he termed "the expression of their approval of his work of the past year, and of their support in conducting the affairs of the association along the lines he has followed during his administration and which he hopes to continue during the forthcoming year."

Business and the Paper Industry

Deputy Governor Case of the New York Federal Reserve Board closed the morning session with a short talk on the Federal Reserve banking system, in which he outlined how the Federal Reserve banks throughout the country operate or function. Mr. Case pointed out that the Federal Reserve banks bear the same relation to business as paper manufacturers bear to paper consumers, the Federal Reserve banks serving as a source of money supply for banks scattered through the country who in turn finance the business operations of manufacturers and merchants, similarly as paper manufacturers serving as a source of supply for paper used by paper consumers. He designated the Federal Reserve banks as "wholesalers of money" and as "reservoirs of liquid financial resources."

The afternoon session was opened by L. M. Alexander, of the Nekoosa Edwards Paper Company, Port Edwards, Wis., national councillor of the American Paper and Pulp Association to the Chamber of Commerce of the United States, who made the following address:

ADDRESS BY L. M. ALEXANDER

"The Chamber of Commerce of the United States and Industry" is the way in which the makers of this program have chosen the subject on which I am advised they would like to have about twenty minutes taken. I suspect that when they used the word "Industry" it had in mind the Paper Industry.

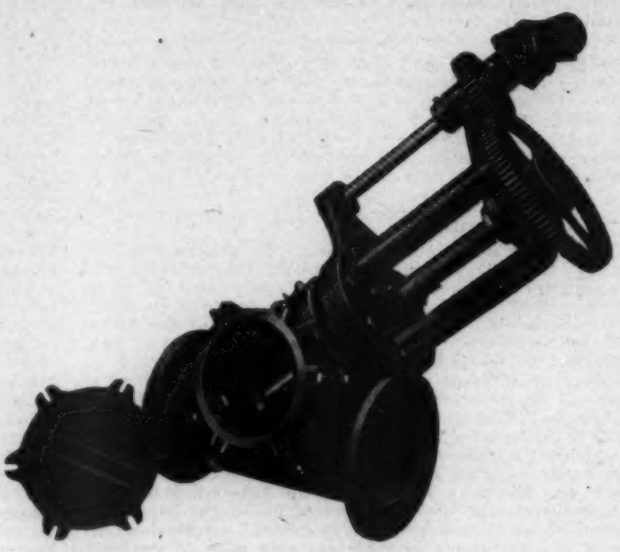
There are at the present time but few industries that are making satisfactory progress on the road to reasonable prosperity. The panacea for such restoration is covered up by a multiplicity of views so varied that Joseph's coat would not be recognizable, so vast are the word artists' colorings as to the prescribed shade for attaining results. In most cases such prescriptions are illusive. The good old-fashioned way of first seeking a good foundation for guidance is undoubtedly the shortest road to reach a satisfactory goal.

May we then not ask what can the Chamber of Commerce of the United States do to assist the paper industry? It seems almost like a tax on general intelligence to attempt to present any features respecting this great organization, the character and scope of which is more or less well understood by our people. However, it will probably not be amiss in the short time allotted for this paper, for us to visualize a little on the foundation of this association. I have, therefore, caused to be enlarged an outline of the plan of organization and scope and extent of the territory covered and I trust they are of sufficient size so that they may be seen by all of those who are nere present. It might be well, also, at this time, to state the manner which led to the final completion in 1921 of the present.

The Horkman

Improved Safety Blow-off Valve

Made in 8, 10 and 12-inch sizes. Blueprints and specifications furnished upon application.



Paper Men Told Me I Ought to Advertise This

As you know, the Neenah Brass Works does a great deal of work for paper mills. In studying acid proof metals and repairing valves, etc., I hit upon a new type.

"Great!" a local paper mill man I knew said, "Give us one." It worked like a charm, making him a lot of money.

Then I received orders for valves from his friends in the business. Whenever mill men by chance happened to see it, they ordered one. "You ought to advertise that blow-off valve of yours," I was told. So here it is. It has made money in every mill it has been placed in. I think it will in yours.

Tear off this coupon and mail it, and I will give you all the facts. Better still, give me some dope about your mill, and I'll figure out for you what it will do. There the coupon is—in the lower right hand corner.

Henry Horkman
The Neenah Brass Works
Neenah, Wisconsin

Henry Horkman
Dept. 44
Neenah Brass Works
NEENAH, WIS.

Tell us about the Horkman Safety Blow-off Valve.

Name .....

Address .....

Organization

In April, 1912, the President of the United States and the then Secretary of Commerce, invited about 500 representatives from commercial organizations throughout the country to a meeting in the city of Washington, and at that meeting the foundation for the Chamber of Commerce of the United States was laid down and plans were started which, as perfected during a period of nearly ten years, has exceeded all expectations in magnitude.

A set of by-laws was adopted in 1913, but amended in 1916 and again in 1920, greatly improving the machinery to attain objectives aimed at.

Outline of Organization

May I again direct your attention to the charts before you, which are interesting, showing the subdivisions of the country from which comes the creating power of the machinery necessary for directing this organization?

On one of these charts there is shown nine great districts that cover the territory which furnishes the elective delegates, who are known as National Councillors.

It also shows four great subdivisions with additional advisory representatives selected under provisions of the by-laws, such divisions being known as the Eastern Division, the North Central Division, the Southern Central Division and the Western Division.

The primary organization membership is represented through National Councillors. The working organization is represented by thirty-four directors that are elected and fourteen directors who are either officers of the organization or are appointed to act in an advisory capacity. In addition to the Board of Directors and the officers there is an Executive Committee composed of twelve.

Working Plan

I direct your attehtion to the other chart which illustrates the various departments of this organization and what is proposed and how it shall be applied. From this chart you will observe that there are three kinds of memberships:

1. Organization members.
2. Associate members.
3. Individual members.

These three memberships, through the National Councillor, choose the Board of Directors, who in turn choose the Executive Committee, the Senior Council and various other officers, including committees, regular and special as well as the department committees.

Magnitude of the Organization

It is reported that there are 1,431 commercial organizations from different states, cities and villages, whose separate membership covers more than 800,000 persons, and besides this, in the associate and individual membership, there are nearly 15,000 more.

The different associations or organizations that have representation, according to a list prepared by the Chamber of Commerce, giving the names of the presidents of organizations, under date of Jan. 10, 1922, subdivided as follows:

Chamber of Commerce	768
Boards of Trade	63
Manufacturers' Association	171
Merchants' Association	18
Miscellaneous	411

The miscellaneous includes specialized organizations such as the American Paper and Pulp Association, which covers the entire country.

When one reflects that from organization membersship alone, nearly 1,500 National Councillors are eligible for meeting to nominate directors and to aid and advise with the directors in all matters connected with the carrying on of the work of the Chamber, it is more easy to comprehend the magnitude of representation from all parts of the United States, through their connection with the Chamber of Commerce and the National Councillors make for size an exceptionally large body of men.

This body meets independent of the annual meetings for the purpose of selecting a nominating committee who in turn select the board of directors from those whose names are presented to the annual meeting and there all National Councillors, including properly authorized delegates, are privileged to vote upon the selections.

Through the courtesy of the present President of The Chamber of Commerce of the United States and other first hand sources, this information has been gathered and while it may be somewhat lame in some particulars by improperly describing the set up of the Chamber, it is near enough for us to grasp the situation of force by numbers.

What Can This Organization Do for the Paper Industry?

The Chamber of Commerce of the United States has set up a very large and varied lot of storehouses and in a certain sense from which it is supposed and claimed by the Chamber, they can be of great benefit to business of this country and one of their slogans is "Service."

In general, they advertise the Chamber as "National Organization of American Business Men", "The Voice of American Business," "The Spokesman of Fifteen Hundred Commercial Organizations." These are comprehensive sounding titles, but let us get down to more definite detail.

First: There is the—Information Bureau.

Through this bureau they are able through a well organized and expert staff to keep information as to the merits and needs of any particular industry by having articles printed in the thousands of newspapers and fifteen hundred trade papers, reading matter from time to time which reach in the neighborhood of from five to ten million people; the value of industry such as ours before a public who have heretofore known but comparatively little about the great paper industry of the country. How would our Association like to have the privileges of contributing articles for such a purpose?

Second: Then there are the representative departments, eight in number, which have been aptly termed the cross sectioning of American industry:

A—Civic Development Department. Equipped to advise how to set up any organization or association of business under the bureau plan such as: organization service, education service, housing and city planning, immigration, citizenship, and National civics. Is there anything in this department that could be useful to our association?

How about our organization service for the American paper and Pulp industry and is it all that it ought to be or as we should have it? Could they help us along this line?

B—Domestic Distribution Department. It is claimed that this has to do with taking care of the large bodies of by-products and waste materials and the economic formula for treating this subject intelligently with any industry. Do you know of any paper mill or mills in the industry that could get any good out of that? Poor packing, loss in transportation, bad order deliveries—anything in these suggestions worth while?

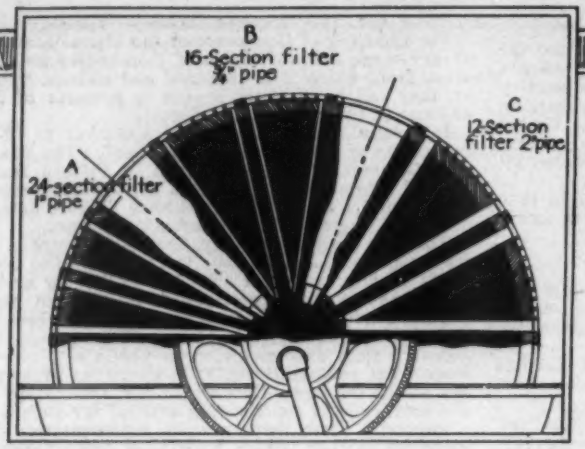
C—Fabricated Production Department. This is about the only department that our association, in common with all industries, that transforms the raw material into the finished product and is eligible to representation in the Chamber of Commerce of the United States with our own director.

This department is intended to help standardize in everything. Cost Accounting; decreased variety in production, which means decrease in investment, in inventories and stocks, and decreased cost. A means of communication between industry and the Federal Trade Commission and direct connection with the Bureau of Standards and constructive information; proper understanding of vocational work. Interpretation could prevent cancellation of orders; methods of adjusting contracts that have been repudiated; employment relations; wage adjustments and labor statistics. Would this Department with its corps of experts, ready to consider and acquaint you with your difficulties be worth anything to any of the members of our Association?

D—Finance Department. I imagine at the present time that we are more interested in seeing the collars and feeling of them than hearing about them. Still, there is a way which, under the guidance of the committee that serves the finance department, so that the industry needing the money can be put in touch with the financial institutions that have the money to spare. I am sure that the paper industry at this particular time is greatly interested in the financing. There are a lot of savings can be made through taxes and otherwise and this Chamber claims they are thoroughly equipped to do all this work.

E—Foreign Commerce Department. To a goodly number of members of the Paper Industry, this is exceedingly an important proposition, especially those who live close to the seaport. Unfortunately, the channels of commerce on the high sea can be made to sail both ways—coming and going. Could the Chamber of Commerce help us so that we would not be in the position that we are just now, when we are hurt both by the coming and going? The average manufacturer in the paper industry is exceedingly sensitive as to all of these situations and it is reflected in the consuming trade everywhere.

F—Insurance Department. If there is any representative of the paper industry that does not know more about insurance than anyone or all of his neighbors in the industry, he would be a curiosity. Still there are some who do not really know it all and the department which has been organized in the Chamber of Commerce, might be able to tell us something about insurance that we do not know. Experience is always a great teacher, but an expert's advice with experience make a good combination.



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These three cross sections show how the Oliver is adapted to very diverse filtering conditions.

Type A—Twenty-four sections with 1" pipe for a rapid filtering granular product.

Type B—Sixteen sections with ¾" pipe for a relatively impervious cake with a small volume of filtrate. An economical type of filter.

Type C—Twelve sections with 2" pipe for a very rapidly filtering cake such as paper pulp.

Similar variations in construction combined with changes in 1, cloth; 2, drum speed; 3, percentage of submergence; 4, regulation of vacuum; 5, position of blow; and 6, temperature of feed; permit a flexibility of adjustment sufficient to handle products of widely divergent natures.

The adaptation of the Oliver to the continuous automatic washing of wood pulp is the greatest forward step during recent years in the paper industry. Manufacturing costs are reduced, due to economies effected in wash room and other departments.

Our Bulletin No. 13—just off the press—deals exclusively with the latest innovations in the washing of wood pulp. Your copy will be sent by return mail upon request.

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G—Natural Resources Production Department. One of the big things in connection with this Department is the interest being taken in our National Forest policy. Surely the paper industry can find common ground in co-operating with this feature of the Chamber.

H—Transportation and Communication Department. This feature, especially with reference to railroad rates, will call up about the largest expression of indignation and burning shame attitude imaginable. The Chamber does not proffer any experts or anything, in fact, to help you along these lines. For one department at least, the vital feature to our association cannot be especially helpful.

It is understood, however, that there are a good many matters which, if you will take a little time to study, will furnish information that could not come amiss or be available from any other source.

I would like to conclude that in addition to what suggestions have been made above, there are many others than the representative activities that should be duly considered as a while by each member of the American Paper & Pulp Association.

One of these features which is being worked hard is that of industrial relations. One of the officers of the chamber stated as follows: "The subject of industrial relations is a delicate one. During the war, we were not recognized officially in the field of industrial relations. At that time such organizations as the National Association of Manufacturers and the National Industrial Conference Board were applied to regarding matters pertaining to this subject. Since the war, the picture has changed."

The pointed suggestion in regard to these two great organizations should be considered with great seriousness. Industrial relations, like railroad rates, are liable to prove equally as important to be handled outside as to be handled inside the Chamber of Commerce of the United States. I think co-operation, such as is recommended by the administration of all dominant political parties, is highly desirable. These associations have been recognized as in the interest of all the people as well as the Chamber of Commerce of the United States. I hope the merits of these two other very large bodies, which are wonderfully efficient and beneficial to industry, will be considered at a later time. I think that since the cessation of war the favorable picture of them has not changed.

I hope from the above presentation of certain matters connected with the United States Chamber of Commerce that a wider and more enthusiastic view will be exhibited by the American Paper & Pulp Association and regret exceedingly that I represent its beneficial conditions so poorly.

ADDRESS BY DR. WARREN M. PERSONS

"There will be an increase in business activity, building construction, and the volume of manufacture this spring. In fact, this movement is already in progress. The improvement will not be merely seasonal; it will be a substantial revival continuing through 1922 and probably some part of 1923. This does not mean that a business boom is in prospect. It does not mean that 1922 will be a year of easier money, but that better business and higher profits than was 1921, and that industry will swing upward from depression toward prosperity."

These were remarks of Dr. Warren M. Persons, professor of economics at Harvard University, who spoke on the subject of "Business and Industry and the Paper Manufacturer", illustrating his address by numerous statistical charts and graphs. Dr. Persons continued:

"It is highly probable that improvement in business, now as in the past, will be accompanied by rising prices. The prices of wheat, corn, livestock, and other farm products have risen considerably during the past four or five months, and it is likely that future increases are in prospect. The prices of many minerals and other raw materials are still so low that they are out of line with wages, retail prices, and the wholesale prices of manufactured goods. It is probable, on the evidence of price records, that during the next year or two the prices of a considerable number of important basic commodities will show an increase of 25 to 50 or even 100 per cent above the low points of 1921. Upon the same evidence it is reasonable to expect that the general average of wholesale prices will show an increase of about 10 per cent. This does not mean that all wholesale prices are likely to increase, that liquidation is complete in every industry, or that wages and retail prices have reached rock bottom. It does mean that price maladjustments will be corrected and that during the process of correction the general trend will be upward. That is to say, in general, wholesale commodity prices will be higher six months or a year from now; the trend during the next five or ten years, however, is another question."

Ten Minute Talks

Closing the general meeting of the American Paper and Pulp Association, officials of the affiliated associations outlined in ten-minute talks the service these individual associations are performing. George E. Williamson, president of the Technical Association, spoke as follows on behalf of his organization:

"The demand for technical education by the employees in America's paper mills have exhausted the first edition of the first of the five volumes of text books prepared for mill workers at a cost of over $40,000 to the paper manufacturers. The first volume is already being reprinted before the fourth volume of the series is published, according to the report made today by George E. Williamson, of Mittineague, Mass., president of the Technical Association of the Pulp and Paper Industry, at the forty-fifth annual convention of the American Paper and Pulp Association.

"Paper mills in five states are preparing to establish classes to train their employees for promotion, even before the text books which are to be used are completed, and in some of the mills preliminary instruction is already under way.

"The educational work is being done in co-operation with federal or state bureaus under the Smith-Hughes Act, and the paper manufacturers financed the preparation of the text for the books. The first two volumes were out a few months ago, the third was published last week, and the remaining two are expected during the summer, but already the first edition of the first volume is exhausted. In reviewing this work, Mr. Williamson pointed out that in addition to the $40,000 paid for preparing the text, the mills are expending many more thousands of dollars for the purchase of the books to be given to their men.

"Classes are under way in four mills in three states, these mills being those of the Strathmore Paper Company at Mittineague, Mass.; of the S. D. Warren Company in Maine, and of the Marathon and Nekoosa-Edwards Companies in the Wisconsin River valley. Preliminary plans are being made for classes by the Hammermill Pa. Company, at Erie, Pa.; at Appleton, Wis., lecture classes for paper mill workers are already under way.

"A most important development, however, is in the Miami Valley of Ohio, where preliminary plans are under way for the establishment of classes open to the men of all the mills in that region, under supervision of a manufacturers' committee. This is the first of a series of regional classes which will undoubtedly be established in other important paper making districts when the text books are available for distribution."

S. L. Bush, of the Chemical Paper Mfg. Company, Holyoke, Mass., made a few remarks on behalf of the Cost Association of the Paper and Pulp Industry, of which he is president; H. H. Reynolds, of the B. D. Rising Paper Company, Housatonic, Mass., outlined the service being performed by his organization, and John H. O'Connell, president of the Superintendents' Association, spoke on behalf of his association.

American Paper and Pulp Banquet

Almost a thousand members and guests, including leading paper manufacturers, distributors and jobbers from all parts of the country and Canada, attended the forty-fifth annual dinner of the American Paper and Pulp Association in the Waldorf-Astoria Hotel, New York, on the evening of April 13, which brought the convention of the association to a close. The grand ballroom of the hotel was beautifully decorated in light blue and gold, hangings of these colors being tastefully draped over the fronts of the three tiers of boxes, and suspended all the way across the ceiling from each side wall. Bunches of American flags were placed at different points in the room.

President Walter J. Raybold acted as toastmaster, and on either side of him sat the speakers of the evening, the Hon. Frank B. Willis, United States Senator from Ohio, and Edward James Cattell, statistician of the city of Philadelphia. After the serving of a sumptuous seven-course dinner, President Raybold spoke briefly of the forty-fifth anniversary of the association and of the beneficial work that has been performed by the organization and which it is still performing in a much broader scope than hitherto. He referred to present business and industrial conditions, and stated that the last two years with all of their difficulties, trials and tribulations for the manufacturer and merchant have not "been two years of loss but of gain," in that the business interests of the country have gained in experience, in confidence and in hope.

In introducing Senator Willis, President Raybold, mentioning the fact that President Harding, then a Senator from Ohio, three years ago appeared as the principal speaker at

Turn the fight of 1921 into the VICTORY of 1922

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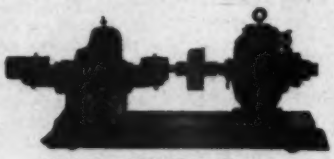
THE "little" leaks, the ones that seemed insignificant a few years ago, add up into big figures when fuel is high and production is low, could have been checked if the proper equipment had been installed.



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Each one of the devices here shown will do its part to eliminate those leaks. In hundreds of steam plants throughout the country, one or more of these devices is *saving coal-dollars,* every day, year in and year out.

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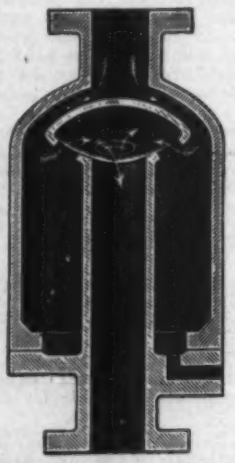

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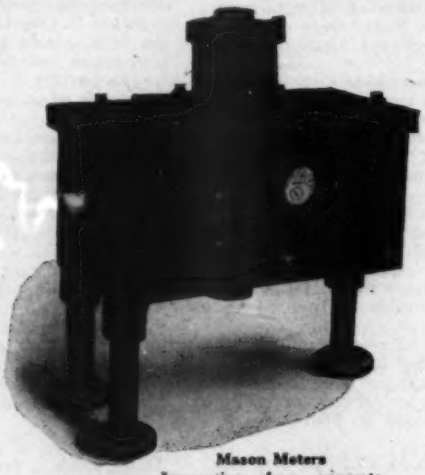

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the annual dinner of the American Paper and Pulp Association, and that in consequence of the happenings in the interval since, he considered it a "dangerous thing for a Senator from Ohio to be a speaker at the annual gathering of paper manufacturers."

Senator Willis delivered a forceful, inspiring speech on the subject of "Business and Government." He was loudly applauded when he stated that in his estimation "business can teach Government a whole lot more than Government can teach business."

Senator Willis's speech follows, in part:

Senator Willis

"It is a curious fact that industry moves in cycles. For centuries it was supposed that paper could be made only from cotton and linen rags. Rags from gutters and junk heaps—rags reeking with filth and disease were eagerly sought from Peking to Philadelphia as materials for milady's delicately perfumed notepaper; and then in 1867 the world, taking advantage of the discoveries of Fennerty and Keller, began to make paper from woodpulp just as the Moors did 800 years before in Spain, and the cycle was complete. This essential industry, so honorable in history and ancient in lineage, has in the few decades since its re-discovery grown to immense proportions.

"The latest available data shows 718 establishments engaged in the manufacture of pulp and paper or both with an investment of capital amounting to $550,000,000; these plants employed 90,000 men, paid out $53,000,000 in wages and turned out an annual finished product of $335,000,000. It will be observed that it takes approximately two years product to equal the fixed investment; this indicates a very high investment of capital as compared with other industries and constitutes one of the serious problems of the business. The turnover is too slow, and dependence on local conditions of timber supply too great and the risk too serious to make investment attractive. I saw one paper machine at work in Wisconsin that cost $300,000. Such machinery is too bulky and costly to be moved from place to place and hence a constructive program to supply essential raw material in the immediate vicinity must be adopted.

"If the pulp and paper business is permitted to become ambulatory it will walk clear out of the country and across into Canada. We must keep it at home where it belongs so far as economically possible. Canada is a vigorous, friendly competitor. She can produce mechanical pulp 23% lower and chemical pulp 19% lower than it can be produced here. Your Association has been active and far sighted in preparing a program as helpful to the general economic conditions of the country as it is essential to the maintenance of the pulp and paper industry as part of the symmetrical economic life of America. In brief, the plan contemplates National and State legislation looking to surveys and classification of forest lands, both public and private, and appropriations for protection, care and management of forests, and the distribution of forest-planting material; further appropriations for acquiring by National and State governments, either by direct purchase or by exchanging timber land for cut-over land, regions suitable for permanent forests; appropriations for tree-planting research and investigation; revision of the tax laws in the direction of offering an inducement to private forestry; and co-operation between private owners and Government in fire protection.

"As business men you have succeeded because you have required co-ordination, co-operation and economy in your business; you could never pay dividends if each of your departments were a rival of the other, and if there were no relation between income and expenses. The Government of the United States is a great business, the greatest in the world and it should be and must be run according to business principles. Efficiency must be promoted and economy wrought even if those hiding behind bureaucratic camouflage are loud in their denunciations of a program of efficiency and economy which cuts off the payroll 2,000 persons per week. Heavy moss-covered tradition will have to yield in the interest of better service and a tax reduction of $800,000,000 in a single year. No sane business man or manufacturer could expect to keep out of the hands of a receiver if he did not establish and maintain in his own business a budget to require co-ordination and bring outgo on speaking terms with income. To make this essential reform in national finance possible Congress enacted a law providing for the establishment of a budget system. The Executive wisely selected to take charge of this new work is an aggressive, masterful, hard-hitting business man and soldier, General Charles Dawes of Ohio and Illinois.

"Coincident with the passage of the Budget Act, the President of the United States, for the first time, actively assumed his responsibility as the head of the business organization of government, and directed his efforts towards securing a reduction in the running expenses of the Government for the present fiscal year, notwithstanding it was the intention that the Budget Law should commence to be effective in connection with expenditures for the fiscal year 1923. The President therefore called together in June, 1921, all the members of the business organization made up of heads of Departments and announced a policy of retrenchment in unnecessary expenditures. At this meeting there was a direct imposition of Executive pressure and policy upon the business organization as a whole. It had immediate results, and at the end of thirty days the President was assured a saving of $112,000,000 out of current appropriations, which amount was put aside in a reserve fund, which has since been increased.

"In the meantime, for the purpose not only of continuing intelligent imposition of Executive pressure and plan upon the routine business of Government, but also for the purpose of proper current handling of business under one head, the President established by Executive Order a number of co-ordinating agencies, acting under Executive authority and concerned with the transaction of business in terms of the Government as a whole as distinguished from forty-three separate, rival, power-seeking departments and independent establishments now existing. Without going into detail, the result of this effort has been most gratifying to the friends of economy and efficiency. At the beginning of the year the departments and establishments estimated that the fiscal requirements of the Government for the present fiscal year ending June 30, 1922, would be $4,550,000,000. By continuing through the Bureau of the Budget and co-ordinating agencies, Executive pressure and plan, the President was able to announce to Congress in December that the expenditure of the Government would be kept down to a figure of $3,968,000,000, a reduction of $582,000,000. Under the co-ordinating agencies there were effected inter-departmental transfers, in about four months, of over $100,000,000 of property, preventing corresponding recourse to the outside market, and thus saving the taxpayers money.

"The expenditures for the first nine months of the present fiscal year to March 31, 1922, amounted to $2,904,037,946.59. Prorated over the entire year this indicates that the Government is well within the sum of $3,968,000,000, which was estimated in December 1921, as the amount necessary to carry through the year; ours is the only important Government in the world actually living within its income and paying its debts.

"The routine business of Government has been reorganized, duplicate purchasing co-ordinated so that different Departments no longer bid against each other in the same market and actually buy at different prices on the same day. Extensive work with current results is now being done in simplification of routine business, and establishment of the principles which govern all properly run private organizations. The Budget Bureau succeeded in sending in its estimates promptly at the opening of Congress in the new form authorized by law. The sum of $3,968,000,000 expenditures for the year represents not only a decrease of $582,000,000 from the estimates of the amount necessary made by the departments and establishments at the beginning of the year, but a decrease of over $1,500,000,000 from the actual expenditures for the fiscal year 1921. This represents actual saving of more than $4,000,000 per day, $160,000 every hour, or more than $2,500 every minute of every hour of every day in the year. More business in government is getting results. When an eminent political leader said a few years ago that $300,000,000 per year could be cut from Federal expenses without injury to the service he was looked upon as a doctrinnaire and theorist, yet the application of just plain business sense such as you use in your own affairs, has wrought a saving of public funds five times $300,000,000 in 12 months. Government can help business some, but business can help Government more."

Mr. Cattell's speech was along human interest lines, interspersed by numerous humorous stories and witty sayings. He cited statistics showing that the finances of the United States are not nearly in so unfavorable a position as many are inclined to believe, and brought out one very interesting point when he said that during the war years the United States had conserved something like 24 billions of dollars which under ordinary circumstances would have been spent by Americans traveling in Europe or by this country for foreign-made goods, whereas the total cost of the war to the United States was 40 billions, thus leaving only a comparatively small gap. He stated that the 24 billions of dollars thus conserved represented the hidden spending power of the nation that would in due time become asserted. He urged faith in the future and expressed the opinion that during the next 25 years the

SUPERIOR SPECIALTIES

The Nash Hytor Vacuum Pump for SUCTION ROLLS and FLAT BOXES

Only three principal parts.

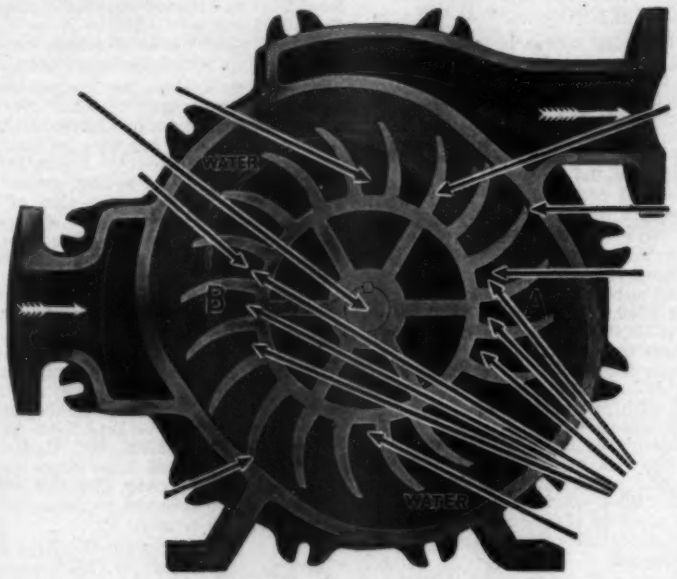
Only one moving part, the rotor.

Shaft is mounted on high grade annular ball bearings outside of casing.

No valves, pistons, rods, crank shafts, loose vanes or gears.

Compression is balanced, eliminating side thrust on the rotor.

Note that rotor runs in casing with large clearance.



High Efficiency. Absolute Reliability.

Air delivered entirely free from pulsation, and therefore can be measured with a Venturi meter.

Air is washed as well as compressed and can contain no oil or other impurities. Can be constructed of Acid-Resisting Metal.

Upkeep cost is practically nothing.

Expert attendant not required.

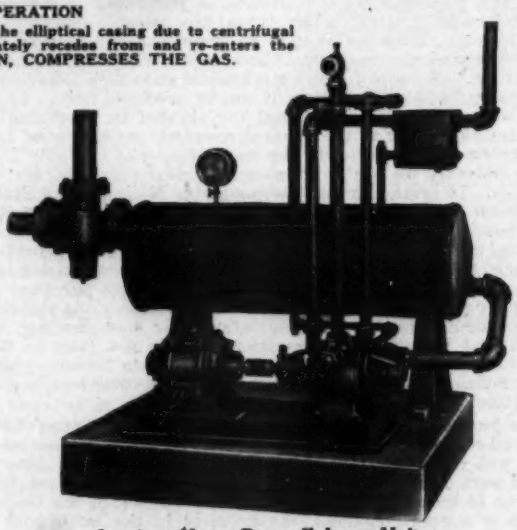
PRINCIPLE OF OPERATION

The water revolves with the rotor but follows the elliptical casing due to centrifugal force. Twice in a revolution the liquid alternately recedes from and re-enters the rotor. THE WATER, ACTING AS A PISTON, COMPRESSES THE GAS.

Armstrong Steam Trap

IMPROVED SYSTEM FOR HANDLING CONDENSATE FROM DRYERS

This consists of an individual Armstrong Steam Trap on return line from each dryer main return header connected directly with the Jennings Hytor Dryer Exhaust Unit. This insures circulation and highest efficiency of dryers.



Jennings Hytor Dryer Exhaust Unit

Bird Screen

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BIRD SAVE-ALLS
BIRD CONTINUOUS BEATERS
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WALPOLE SCREENS
NASH HYTOR AIR COMPRESSORS
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United States would experience a period of prosperity never before equalled.

Divisional Meetings

Waxed Paper Manufacturers' Association

The working men of the United States, particularly in the congested manufacturing districts of the eastern States, are again eating bread. This was the report made at the annual meeting of the Waxed Paper Manufacturers' Association on Wednesday morning by Secretary O. B. Towne. When the working men began to feel the pinch of unemployment, particularly those of foreign extraction, the consumption of wheat bread dropped amazingly, both as indicated by the decreased consumption of waxed paper bread wrappers, but in the case of unwrapped bread as well. This was first felt late in the fall of 1921. The production of waxed paper for consumption in the confectionery trade also dropped off. In February, however, the Easter candy trade began to be reflected in the orders from candy manufacturers for waxed paper, and production until the middle of March was about 50 per cent of capacity. In the last half of March, however, there was a jump from this 50 per cent of production to 75 per cent, due to the ordering of waxed paper for bread wrappers.

C. A. Burskirk, of the Wolverine Paper Company, Otsego, Mich., was elected president of the Waxed Paper Manufacturers' Association, and J. W. Hurlbut, of the Bennington Waxed Paper Company, Bennington, Vt., was elected vice president.

Gummed Paper Manufacturers' Association

The determination of proper standards for the testing of gummed tapes for binding purposes was one of the important subjects taken up at the annual meeting of the Gummed Paper Manufacturers' Association Tuesday afternoon. President C. H. Crowell, of the association, recommended that a tearing test be universally adopted instead of the present puncture and tensile tests, pointing out that scientific apparatus has been constructed which accurately registers the tearing test strength of paper, and saying that a simpler method required only a desk rule or straight edge and a pocket knife or cutting blade to test the strength of gummed paper. In urging the tearing test, President Crowell stated that the present testing method indicates that a tensile strength test of gummed kraft paper indicates it has greater strength than gummed cloth tape. Inasmuch as the gummed paper manufacturers are also the makers of the gummed cloth tapes, he believes that a recognized system of testing would develop a proper use of gummed tapes in the rapidly growing field of fibre boxes. Shipping problems and other matters also were discussed at the meeting.

Mr. Crowell, who is president of the Crowell Corp., Brooklyn, N. Y., was re-elected president of the association; Phillips Kimball, of the Liberty Paper Company, New York City, was elected vice president, and O. M. Porter, of New York City, was again chosen secretary and treasurer. The Executive Committee elected is composed of Messrs. Crowell and Kimball; S. G. Leitch, of the Gummed Products Company, Troy, O.; E. C. Smith, of the Nashua Gummed and Coated Paper Company, Nashua, N. H., and Secretary-Treasurer Porter.

Glassine and Greaseproof Paper Manufacturers' Association

L. T. Stevenson, of the Mountain Mill Paper Company, Lee, Mass., was elected president of the Glassine and Greaseproof Paper Manufacturers' Association at the annual meeting of that organization Tuesday morning. F. M. Boyer, of the Warren Parchment Company, Dexter, N. Y., was elected vice president, and O. B. Towne, of New York City, secretary and treasurer, which officers together with Carl Becker, of the Westfield River Paper Company, Russell, Mass., compose the Executive Committee.

Vegetable Parchment Manufacturers' Association

At the annual meeting of the Vegetable Parchment Manufacturers' Association on Tuesday afternoon, William F. Brunner, of the Paterson Parchment Company, Paterson, N. J., was re-elected president for the ensuing year, and O. B. Towne, of New York City, was again chosen secretary and treasurer.

Writing Paper Manufacturers' Association

Various topics of importance to the fine paper industry were considered at the annual meeting of the Writing Paper Manufacturers' Association, which was held in the East Room of the Waldorf-Astoria Wednesday morning. President Norman W. Wilson, of the Hammermill Paper Company, Erie, Pa., presided, and at the election Mr. Wilson was re-elected president; H. A. Moses, of the Strathmore Paper Company, Mittineague, Mass., was elected first vice president; Fred A. Leahy, of the Eastern Manufacturing Company, New York City, was elected second vice president and chairman of the Sulphite Bond Division of the association, and Emmet Hay Naylor was again chosen secretary and treasurer. Members of the Executive Committee were elected as follows: President Wilson, chairman; Messrs. Moses and Leahy; W. M. Crane, Jr., of Crane & Company, Dalton, Mass.; George A. Galliver, of the American Writing Paper Company, Holyoke, Mass.; W. J. Raybold, of the B. D. Rising Paper Company, Housatonic, Mass., and W. C. Wing, of the Fox River Paper Company, Appleton, Wis.

Cover Paper Manufacturers' Association

The annual meeting of the Cover Paper Manufacturers' Association was held Tuesday afternoon in the East Room of the Waldorf-Astoria, at which F. E. Taylor, of the Advertisers Paper Mills, Holyoke, Mass., was re-elected president for the ensuing year. D. L. Quirk, Jr., of the Peninsular Paper Company, Ypsilanti, Mich., was re-elected vice president, and Emmet Hay Naylor was again elected secretary-treasurer. Messrs. Taylor and Quirk together with C. S. Boyd, of the C. S. Boyd Paper Company, Appleton, Wis., compose the Executive Committee of the association. Thomas J. Burke, secretary of the Cost Association of the Paper Industry, gave an interesting talk on costs at the meeting.

Book Paper Manufacturers' Association

At the annual meeting of the Book Paper Manufacturers' Association in the East Room of the Waldorf-Astoria Hotel Tuesday morning, Grellet Collins, of the Dill & Collins Company, Philadelphia, Pa., was re-elected president; R. D. Smith, of the S. D. Warren Company, Boston, Mass., was elected first vice president; A. L. Pratt, of the Allied Paper Mills, Kalamazoo, Mich., was elected second vice president, and Emmet Hay Naylor was again chosen secretary and treasurer. The Executive Committee elected is composed of President Collins, L. C. Anderson, of the W. B. Ogilesby Paper Company, Middletown, O.; A. H. Nevius, of the Miami Paper Company, West Carrollton, O.; W. D. Randall, of the Champion Coated Paper Company, Hamilton, O.; G. W. Gilkey, of the Michigan Paper Company, Plainwell, Mich., and Vice Presidents Smith and Pratt.

Glazed and Fancy Paper Manufacturers' Association

The Glazed and Fancy Paper Manufacturers' Association held its annual meeting Wednesday afternoon, with President W. H. Shuart presiding. The following officers were elected for the ensuing year: President, W. H. Shuart, of the Springfield Glazed Paper Company, Springfield, Mass.; vice president, N. N. Fowler, of the Hampden Glazed Paper and Card Company, Holyoke, Mass.; treasurer, G. Frank Merriam, of the Holyoke Card and Paper Company, Spring, Mass., and secretary, O. M. Porter, of New York City. Messrs. Shuart, Fowler and Merriam, with I. O. Van Duzer, of Louis DeJong & Company, New York City, and F. O. Walther, of Walther & Company, New York, compose the Executive Committee.

Binders Board Manufacturers' Association

Eugene C. Betz, of the Consolidated Paper Company, Monroe, Mich., was re-elected president of the Binders Board Manufacturers' Association at the annual meeting of that organization on Thursday. Lee H. Davey, of W. O. Davey & Son, Jersey City, N. J., was re-elected vice president, and A. B. Goodrich, of the Riverside Paper Mfg. Company, Glastonbury, Conn., was again chosen secretary and treasurer.

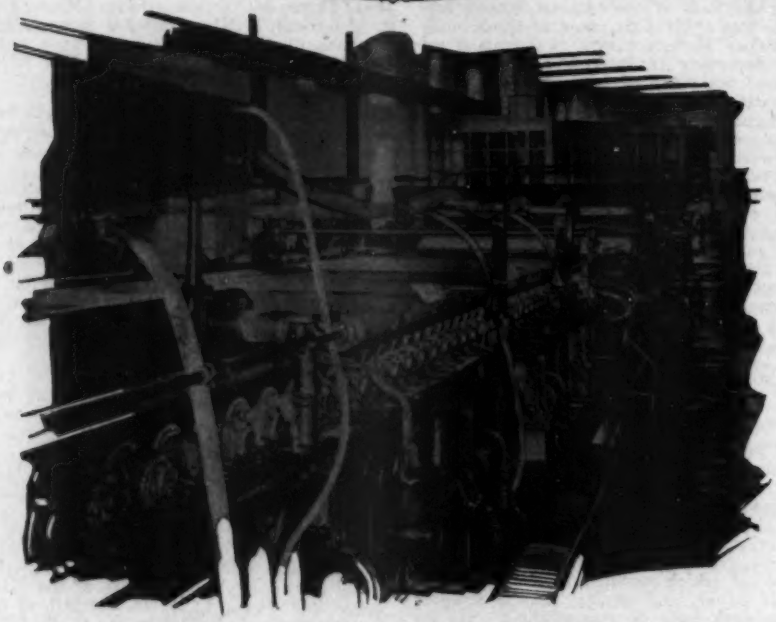
Pulp Manufacturers' Association

The annual meeting of the Pulp Manufacturers' Association was held Wednesday afternoon, at which Thomas W. Ross, of the Hummell Ross Fibre Corp., Hopewell, Va., was elected president, succeeding Henry W. Stokes, of the York Haven Paper Company, Philadelphia. H. H. Bishop was re-elected secretary and treasurer, and the following were chosen to compose the Executive Committee: Clark Everest, of the Marathon Paper Company, Rothschild, Wis.; E. W. Kiefer, of the Port Huron Sulphite Pulp and Paper Company, Port Huron, Mich., and W. H. Savery, of the Harpers Ferry Paper Company, Harpers Ferry, W. Va.

Card Board Manufacturers' Association

At the annual meeting of the Card Board Manufacturers' Association on Wednesday morning, G. Frank Merriam, of the Holyoke Card and Paper Company, Springfield, Mass., was re-elected president; J. A. Lowe, of the Falulah Paper Company, Fitchburg, Mass., was elected vice president; H. W. Suter, of the Champion Coated Paper Company, Hamilton, O., was elected treasurer, and O. M. Porter, of New York City, was re-elected secretary. Messrs. Merriam and Lowe, and

SKF



When Table Rolls Stick What Happens to the Fourdrinier Wire?

WHEN table rolls on Fourdrinier machines stick, due to friction in the bearing or misalignment of the roll, that part of the machine becomes a menace to continuous operation. The constant drag of the wire wears a flat place on the stopped roll and causes expensive injury to the wire. A premature shutdown of the entire machine is threatened to make the necessary wire change.

SKF marked self-aligning ball bearings eliminate such troubles. They permit the rolls to run freely, save wear on the wire and keep it properly leveled so that weight is distributed uniformly over all the rolls. They are mounted in water-proof housings and need lubrication only at long intervals.

Table rolls, wire rolls, breast rolls and wet ends are only a few of the places where ball bearings are used to great advantage on paper making machines. Write to our engineering department for details.

THE SKAYEF BALL BEARING COMPANY

Supervised by SKF INDUSTRIES, INC., 165 Broadway, New York City

George A. Smith, of the New York-New England Company, Holyoke, Mass., comprise the Executive Board.

Technical Association Meeting

THE seventh annual convention of the Technical Association of the Pulp and Paper Industry was held at the Waldorf-Astoria Hotel, New York, from Monday to Wednesday, April 10-12, inclusive. There were meetings in the mornings and afternoons, and all of the sessions were well attended.

All of the officers of the association were re-elected for another year's term. George E. Williamson, of the Strathmore Paper Company, Mittineague, Mass., was re-elected president; Frederick C. Clark, of the Pejepscot Paper Company, Brunswick, Me., was again elected vice president, and William G. MacNaughton was re-elected secretary and treasurer. The Executive Committee elected consists of the following: George E. Williamson, chairman; Frederick C. Clark, Grellet N. Collins, George N. Harvey, E. C. Tucker, George K. Spence and Robert S. Kellogg.

The Nominating Committee consisted of W. L. Nixon, of the Chemical Paper Mfg. Company, Holyoke, Mass., chairman; and Messrs. Meyers, Wood, York and Curtis, and the election was by acclamation, there being no opposition to the ticket named by the committee.

In his annual address, President Williamson said:

President's Address

"The twelve months just past, comprising the Technical Association year, have been quiet ones in business and industry; not so with this association. The spirit of reaction so rampant and wide spread has affected us; but withal, it has been a year of progress and achievement.

Co-operation with American Paper and Pulp Association

"One of the first problems to which the Executive Committee gave attention was that of closer co-operation with the American Paper and Pulp Association. As a result of careful deliberation, the offices of our association were moved in August to 18 East Forty-first street, which building now houses the headquarters of the American Paper and Pulp Association, Writing Paper Manufacturers' Association, Pulp Association, Cost Association, Woodlands Section, Salesmen's Association, and Technical Association.

"It is needless to say that this close contact permits more intimate co-operation with the parent association and subsidiary organizations, and also allows greater efficiency and reduced costs in the operation of our office.

Change in Office of Secretary-Treasurer

"One of the outstanding events of the year has been a change in the office of secretary-treasurer. In September, Thomas J. Keenan, secretary-treasurer of the association since its organization, presented his resignation to resume the editorship of Paper. The Technical Association is deeply indebted to Mr. Keenan for his faithful, painstaking and conscientious service, and for the large and prominent part he has taken in giving the association the standing it has today in the pulp and paper industry.

"We were particularly fortunate that circumstances permitted us to obtain the services as secretary-treasurer of William G. MacNaughton, a charter member and former officer of the association. Although Mr. MacNaughton has been with us since December only, his technical education and training, together with his wide practical experience in the industry, have permitted him to take up the work vigorously and with little hesitation.

"It was planned that Mr. MacNaughton should assume office November 1, but he was unable to do so on account of a serious accident. Through the courtesy of the Cost Association, Thomas J. Burke, secretary, acted as assistant secretary of the Technical Association during the month of November. We are indebted to Mr. Burke and the Cost Association for their timely assistance in the emergency.

Hopes for Future Joint Meetings

"An invitation was received a year ago from the Superintendents' Association of the Pulp and Paper Industry for a joint meeting in the fall. Accordingly, arrangements were made for a meeting to be held during October in Washington, D. C., Wilmington, Del., York, York Haven, and Philadelphia, Pa.

"On account of unfavorable business conditions existing at the time, however, it was thought best by the officers of both associations to cancel the meeting. Our Executive Committee, however, placed itself on record as in favor of a joint meeting at some future time.

"The Superintendents' Association renewed the invitation for a joint meeting in connection with their annual meeting in June. On account of the close proximity of that date to this of our annual meeting, it was decided by our Executive Committee that a joint meeting at that time would be impracticable. However, it is hoped and expected that such a meeting may be held when conditions will permit.

Importance of Work of Standing Committees

"A genuine endeavor has been made this year to obtain more than ordinary results from the work of standing committees. While the work and product of committees is important in all associations, I believe it is vital in the case of our own.

"An association like ours, organized primarily for service to an industry, can justify its existence only on two grounds; namely,

"1st. The development and dissemination of knowledge which will in any way advance the industry.

2nd. The affording of means for its members to become acquainted, to exchange ideas, and to encourage and stimulate interest in upbuilding the industry.

"To my mind, committee work is the root of an association's life. If that work is good and effective, and the results are worth while, the association will grow strong and prosper. If committees are non-productive and fail to bring forth achievements beneficial to the industry, then the association must falter and its influence and standing must decline.

"I stress this point somewhat at length because I discern clearly in it the most important problem concerning our organization today. The present enviable position of our association is due, I believe, to the excellent work done by some of our committees. I feel, however, that some of our members do not realize the opportunity for service to the industry as well as the benefit to themselves that exists in sharing the work of our standing committees.

"It is my earnest hope and recommendation that ready response be made to the appeal recently sent out by the secretary with reference to service on committees, and that members of committees will work when requested by committee chairmen.

"Several suggestions have been made recently for improving this most important phase of the association's activities, which should receive the careful consideration of the incoming Executive Committee. Among these may be mentioned a more homogeneous plan of committee organization, a tying in of the service to members program with the work of the standing committees, and the appointment of the secretary of the association as secretary ex officio of all standing committees.

Committee on Service to Members Formed

"Resulting from the group meetings held at the annual meeting a year ago, a committee on service to members has been formed during the year. This committee has undertaken a tremendous task, but one of inestimable value to the members, provided the members will co-operate. The report of this committee will show the results of its activities to date and some of the possibilities before it.

"I bespeak your careful attention to this matter, as the thought underlying this plan, if properly developed by the membership at large is capable of bringing forth most beneficial results to the members and eventually to the industry.

Dissemination of Literature

"'Technical Association Papers, Series 4', containing papers and addresses presented at the annual meeting of 1921, together with a directory of officers, committees, and members, was published in June. It is a very creditable piece of work, but the cost of publication is greater than the resources of the association can continue to meet.

"Feeling the urgent need of a better means of publishing not only the papers and addresses given at meetings, but also the large amount of technical literature which is appearing constantly, your executive committee has made a co-operative arrangement with the Paper Trade Journal, which it believes will prove very beneficial to the association.

"This publication, as you know, has established a Technical Department to appear weekly under the editorship of the secretary of the Technical Association. All members are placed on the subscription list with the price of subscription paid by the association. In addition, the Paper Trade Journal will print and distribute, free of charge to members, all reports of association meetings in a form similar to 'Technical Association Papers.'

"During the year, arrangements have been made for an exchange of publications with the Forest Products Laboratory of Canada, and the Technical Section of the Paper Maker's Association of Great Britain and Ireland.

Westinghouse Sectional Paper Machine Drive

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Iroquois Falls
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What Would You Have Done?

Most people look with doubt upon new developments and await time to prove or disprove their value.

The Abitibi Power and Paper Co. purchased Westinghouse Sectional Paper Machine Drive when there was only one other sectional drive installation in the country employing an automatic system of speed control.

You might not have done as the Abitibi Company did, but the evidence of successful performance, *even then*, was convincing to this company, and its good judgment has been confirmed by the excellent operating results since obtained.

In every case where Westinghouse Sectional Paper Machine Drive has been installed, it has won unqualified approval.

Look over the list of advantages and write our nearest district office for any additional information desired.

Westinghouse Electric & Manufacturing Company
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Sales Offices in All Principal American Cities

The Reasons for Reduced Production Cost

INCREASED OUTPUT: — Higher operating speeds. Production interruptions greatly reduced.

LOW MAINTENANCE: — Simplified drive, fewer parts.

LESS SPACE:—Less floor space than any other form of drive. Paper machine and drive on same floor.

REDUCED HAZARD: — Personal risk reduced by elimination of dangerous gears, belts, pulleys, etc. Fire hazard is minimized by the elimination of oil wastes and accumulations that accompany a mechanical drive.

INCREASED RELIABILITY AND DURABILITY: — Owing to the inherent reliability of standard electrical apparatus in universal use, this drive is unquestionably more reliable and more durable than mechanical drive.

Westinghouse

Reduction in Dues

"The finances of the association are on a sound basis. The balance on hand is slightly less than one year ago, but this condition was brought about by the unexpectedly heavy cost of publication of 'Technical Association Papers, Series 4.'

"At its first meeting, the Executive Committee adopted a tentative budget for the year, and will recommend a budget for the ensuing year, to which I invite your careful attention. An organization of this size should have a definite financial policy, should operate on a budget plan, and should keep expenditures within the budget allowances adopted.

"During the year, steps have been taken to put our accounting system on a more modern basis, as recommended by the public accountants who have made our annual audits. With the co-operation of Mr. Burke, a new accounting plan has been laid out which will place our books on a uniform basis with those of the parent association, Cost Association, and others, and besides other advantages permit a considerable saving in the cost of the annual audit.

"The increase in dues adopted at the fall meeting of 1920 proved unpopular in the face of declining prosperity in the industry. At a meeting of the Executive Committee held September 15, 1921, it was voted to recommend a reduction in annual dues to fifteen dollars, subject to ratification at this meeting. I recommend, therefore, that you take favorable action upon this amendment to the constitution.

Co-operation with Bureau of Standards

"The Technical Association was invited to send a representative to a conference at the Bureau of Standards held late in the summer, and former President R. A. Hatch was selected. The groundwork was laid for important advances, which, if brought to fruition should benefit the industry. Committees were appointed to draw up standard classifications of grades of paper, and standardization of sizes and grades, with a view to the elimination of waste and unnecessarily high costs of manufacturing operations. A third committee, consisting of three of our members, was appointed on standard specifications and tests acceptable to manufacturers and consumers.

"The Technical Association is also represented on a committee of the American Paper and Pulp Association, representing the industry, formed for the purpose of co-operation with the Bureau of Standards.

"It is in matters of this kind that the Technical Association should be able to render most valuable service to the industry and to the public.

Progress of the Text Books

"Work has continued without interruption on the text books being prepared under the direction of the Joint Educational Committee. Our co-operators across the Canadian borders are outdoing us in the financing of the work, however, owing to their superior methods of raising the necessary money for worthwhile projects. This subject will be covered in the report of the Committee on Vocational Education.

"Now that the books are available, I commend them to your use. Much thought, time and money have been spent in their preparation. It behooves the industry now to reap the benefits and rewards that are possible.

"Our brothers of the Technical Section of the Canadian Pulp and Paper Association have given some attention to the question of apprenticeship; that is, of training young men who enter the industry to learn the various processes of manufacture by practical experience in the mills, supplemented by special study courses. My recommendation is that the committee on Vocational Education make a comprehensive study of this subject in co-operation with the Committee on Education of the Canadian Technical Section, and report fully with a well defined plan at the next annual meeting.

"Owing to business conditions, progress has not been rapid on the plan proposed by Dr. Hollis Godfrey, formerly President of Drexel Institute, for co-operation between leading industries and educational institutions. This plan, to which the paper industry is a subscriber, contemplates training young men for direct service in industry by means of collegiate courses combined with practical experience in the chosen industry, to the end that much time may be saved over the normal training period of many years, and that men may be better fitted to grasp and handle the major problems which confront the industry. It is to be hoped that definite progress may be made in this novel but important plan of education during the coming year.

Group Meetings Planned

"At the last annual meeting, several group meetings were held by those particularly interested in the subjects announced, and with a considerable degree of success. On the other hand, there were some criticisms from those who wanted to attend all meetings, but were unable to do so when two or more were carried on at the same hour.

"This plan is to be following to a degree this year, and I ask your co-operation in giving the secretary your opinion as to the desirability of making group meetings a permanent feature of our annual conventions.

New Committees Formed

"In co-operation with the Cost Association, a special committee of our members has spent considerable time on the subject of depreciation of paper and pulp mill buildings and equipment. Our committee on Bester Furnishes has also worked conjointly with a similar committee of the Cost Association.

"At the request of representatives of the paper mill felt manufacturers, a joint committee consisting of four members of their industry and four members of the Technical Association has been formed, and the report of this committee will explain its purposes and activities to date.

"Recently, we have been approached by the fourdrinier wire manufacturers requesting formation of a like joint committee to give consideration to improvements in the manufacture and use of wires and the development of standard practices affecting them.

"This work of a co-operative nature should, in my opinion, be encouraged, as the possibilities of beneficial results to the industry are large. In order to derive these benefits, however, the spirit of co-operation must extend beyond the committees, must be widespread throughout our industry, and must be marked by an attitude of give as well as receive.

"The Executive Committee of the American Paper and Pulp Association has given considerable attention to a plan for rearrangement of methods of financing and for improvements in internal organization of the association.

"The proposed plan embodies a number of changes which vitally affect the service associations, of which the Technical Association is one. As this matter will be dealt with at the annual meeting of the parent association on Thursday, I will not attempt any discussion of it at this time, but I urge your attendance at that meeting in order that you may be in a position to understand thoroughly the various steps of the plan recommended.

Progress of Technical Development

"During the year, definite progress has been made along the line of technical development in the industry as a whole, and I will mention a few which may be of particular interest to the members of this association.

"NEWSPRINT—The development and commercial application of paper machines operating at higher machine speeds, including the successful operation at 1,000 feet per minute and over.

"Improvements in the control of the consistency of the stock.

"The tendency toward the use of neither beaters, nor, more recently, Jordans.

"MATERIALS—The development commercially of cotton linter and hull fiber pulp.

"Attention is still being directed to the treatment of highly resinous woods, such as Southern Pine, for paper pulp in combination with the recovery of resins and turpentine.

"There is still interest in the possible development of a commercial method of dying printed paper continuing groundwood.

"BLEACHING—A more extended use of liquid chlorine instead of bleaching powder.

"New developments in bleaching apparatus enabling the bleaching of pulp of higher density than customary.

"Examples of these developments are the Wolf system installed at Newton Falls, N. Y., and the possible application of bleachers on the design of the Nisgers and Rabus beaters.

"PULP TREATMENT—Where the fiber constituents are being mixed with little or no mechanical treatment in cases where the constituents are groundwood and chemical pulps. Examples of this tendency are to be found not only in news print mills generally, but also in mills manufacturing book paper and, to a certain extent, in kraft paper mills.

"Considerable attention in this country and some investigation abroad has been made on the chemical treatment of pulp in the endeavor to duplicate thereby the conditions obtained by the use of mechanical methods.

"ENGINEERING—The commercial development in this country as well as in Europe of the electric steam boiler, and its applicability to locations where the cost of electricity is low or where it is desired to equalize the power demand curve.

"The use of the vapor accumulator developed in Sweden in cases where fluctuating steam loads exist. This apparatus is just in the stage of promotion in this country.

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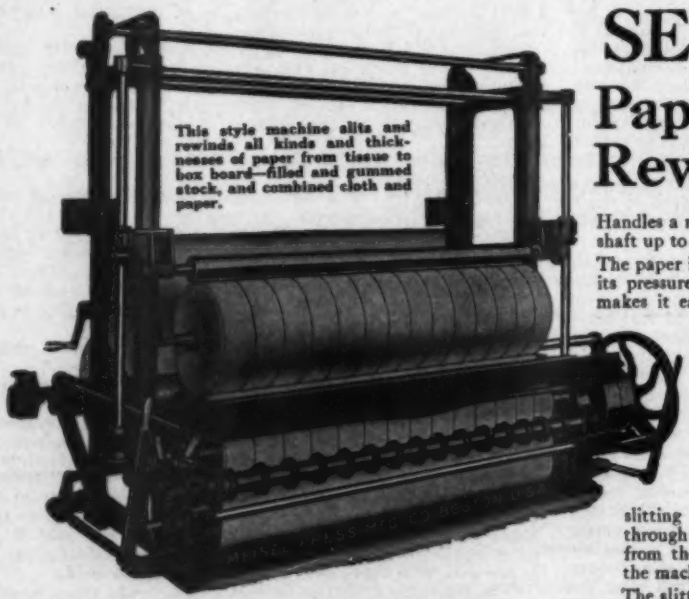
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Another prominent feature of this machine is its convenience. It has a device for separating the slitting cutter shafts to facilitate threading the paper through the machine. All adjustments necessary are made from the operator's place which is at the rewinding end of the machine.

The slitting cutters which are on parallel shafts give a clean, shear cut. The cutters may be quickly adjusted to different widths from 1¼ inch upward, and are clamped to the shafts with ample bearing surface so that they always run perfectly true.

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"The possibility of drying pulp and some classes of paper under vacuum.

"The general tendency in new installations, as well as in improving old, toward the sectional electric drive.

"The encouraging results that have been indicated in the use of pulverized fuel.

The Problems of Waste

"One of the foremost problems in industry today is that of waste. During the past year, a report has been published on this subject by the Federated American Engineering Societies, which has elicited much comment and attention, as well as considerable misrepresentation.

"I believe that the Technical Association can render valuable service by attacking this problem, studying the findings of the above named report as possibly applied to the pulp and paper industry, conducting investigations on the profitable utilization of waste material, and pointing out by means of scientific control methods how many wastes may be prevented or minimized.

"A specific instance has recently come to my attention in the offer of the Forest Products Laboratory to co-operate with the association in an investigation into the possible utilization of barking drum waste.

"I recommend that the subject of waste receive prompt attention, and that the Executive Committee be authorized to place it in the hands of one or more of the present standing committees, or of a new committee created for the purpose.

Appreciation Expressed

"In conclusion, I wish to give expression to my appreciation of the valuable and conscientious work done by the members of the Executive Committee, Secretaries, the Chairman of Standing Committees, and those committee members who have backed up their chairmen by real efforts.

"I cannot but feel that the Technical Association stands today on a broader and firmer basis than has been possible heretofore.

"With the combination of that spirit of service and capacity for work which has characterized the efforts of our membership in past years, the outlook for the future is indeed bright."

Business of the Meeting

Secretary-Treasurer MacNaughton reported that the Technical Association now has a total membership of 477, or 281 active members, 100 associate members, 65 junior members and 31 corporate members. Mr. MacNaughton paid a tribute to Thomas J. Keenan, former secretary and treasurer of the association, who handled its affairs prior to his resignation last fall when Mr. MacNaughton was elected to fill his place. Mr. MacNaughton also outlined various possibilities for improvement in the manufacture of sulphite, sulphate and soda pulps, and suggested that the association devote further study and investigation of this subject.

Robert S. Kellogg, secretary of the News Print Service Bureau and a member of the Executive Committee of the Technical Association, in a brief address recommended a budget system for the association during the coming year, and suggested that the members of the Superintendents' Association be invited to meet with the Technical Association in a joint meeting next fall. Mr. Kellogg also mentioned the helpful co-operation of the Felt Manufacturers' Association and the Cost Association of the Pulp and Paper Industry, and urged that efforts be expended to obtain the co-operation for the association of the manufacturers of Foudrinier wires.

Reports of Standing Committees

Most of the first business meeting of the association was taken up by the rendering of reports of standing committees.

REPORT OF THE HEAT, LIGHT & POWER COMMITTEE

By H. S. Taylor, Chairman

During the past year a number of subjects have been considered by your committee, and of the list considered three have been selected for this meeting, one Illumination, the second Economizers, and the third The Power Plant.

Illumination of the pulp and paper mill has so far had but little study, lighting being carried out to conform to general rules laid down by the underwriters, and I believe that a careful study of the requirements will provide the means for extensive improvements. Mr. Kurlander in his article selects certain methods and equipment for different parts of the mill, and recommends that certain fixed rules be followed.

Economizers in the paper mill power plant is a subject that always promotes an argument, one manufacturer stating that a saving is shown, while the other denies it. Mr. Derry has outlined his views in the following paper and I hope that its reading and the following discussion will clear up at least a few of the vital points.

The power plant is also a subject that is vital to the industry. Messrs. Rogers and Darling have recorded their experience and recommendations as to what the power plant should include and what it should do.

By coincidence, for it was not at all premeditated, the three subjects selected for this meeting are typical of your committee's classification, namely, heat, light and power. Light and heat must come from the power plant, and we therefore generally classify in our minds the three subjects under the word "Power."

Outside of raw materials power is one of the largest single items of expense in the manufacture of pulp and paper, and the average mill offers a most excellent opportunity to effect economies in the cost of power. These opportunities, however, in many instances are either neglected or totally disregarded, provided the supply is ample for the demand, and production is not interf red with. In other words power in the paper mill is a by-product, and is considered, I fear, too much as an aid to the manufacture and not as an absolute necessity, and a very expensive necessity at that.

From a power standpoint mills of the industry can be roughly divided into two classes, the first, those mills that require steam only for drying and heating, with also the demand for cooking provided a chemical pulp mill is a part of the installation, and second, those mills where the entire power demand is fulfilled through steam. While a steam boiler plant is common to both classes, equipment for the conversion of this steam into mechanical power is radically different, and the general characteristics are such that these two types of plant must be treated independently. For instance, in the first class all steam generated is or should be condensed in the process of pulp or paper making, therefore, there can be no consideration of condensing equipment. In the second class, however, condensing equipment plays a most important part, permitting the use of a much more varied line of prime movers.

The steam plant of the first class, while of greater capacity, is much simpler, but a general inspection will prove that in both classes there is an opportunity for a very marked improvement, although it is oftentimes difficult to convince the manufacturer of this fact, primarily, I believe, for the reason that pulp and paper is the reason for the plant's existence. For a confirmation of this statement inspect a power plant whose entire output is sold, its reason for existence being the sale of power, and then inspect a power plant for a large paper mill, the total capacity of which may be greater than the plant first mentioned. The difference in the equipment and the handling of the plant is so marked that it cannot be missed. The plant selling power will show accurate records for each pound of steam or kilowatt of electricity reduced to exact figures of cost, profit, etc., whereas the average paper mill power plant will show a set of figures that are rarely complete, and show the general indifference to facts other than a supply sufficient to meet all demands of the pulp or paper production is at hand.

Again inspect the plant selling power, and except for the general appearance there is no evidence of steam being generated, whereas an inspection of the roof of the average paper mill will prove that steam in a considerable quantity is being generated, this considerable quantity issuing from the numerous exhaust heads and other outlets installed to prevent this waste steam from wrecking the mill internally. It can be truthfully stated that there is absolutely no excuse for waste of steam, and where there is waste, a rearrangement of equipment or the addition of new equipment will place the power plant in the same position as that of the one selling power, namely, every pound of steam represents dollars invested, and a return on the investment is not forthcoming for any quantity passed to atmosphere.

Statistics for paper mill power plant operation are difficult to find. Those from power plants selling power are easy to secure, and with this condition it is difficult to compare the costs, but I do know that if the average paper mill power plant was given the attention both in equipment installed and in operation that is given to the average plant selling power, the return to the paper manufacturer would be beyond his expectations.

The study of the paper mill power plant must not be confined to the steam plant alone, but should be carried through to the final distribution, whether it be steam or electricity, as losses may occur at any point in the entire system, and from my own experience I fully believe that such a study in the average paper mill will lead the way to improvements and corrections that will place the power plant on par with the plant selling power, a condition that must be met in the demand for reduction in the cost of manufacturing.

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REPORT OF THE SULPHITE PULP COMMITTEE

By W. E. Byron Baker, Chairman

Your committee on sulphite pulp submits the following report for the past year, with the hope that it will meet with your approval.

During the period just ended the work of the committee has been somewhat restricted, due to the fact that it was hoped we could meet together at the fall meeting and get committee matters in such a form by personal contact that rapid progress could be made. The failure to hold a fall meeting made the carrying out of these plans impossible.

Recent Work of the Committee

During the past few months the committee has been working in connection with the Bureau of Standards on recommended specifications for lime and limestone for use in the manufacture of sulphite pulp. This work has been completed and copies of the report prepared for this meeting. Any discussion of these recommendations may be taken up at the symposium on sulphite pulp.

Two of the members of the committee will also present papers at this meeting. A. D. Wood will read a paper on "A New Ideal in Chip Breaking," and George Barsky will read a paper on "Sulphur in Sulphite Waste Liquor." We feel sure that both of these papers will be listened to with interest and with profit.

As a part of the committee program there will also be presented a paper on "The Testing of Reclaimed Sulphite Acid," by Gösta P. Genberg, chemist of the Nekoosa-Edwards Paper Company. The committee hereby expresses its thanks to Mr. Genberg for this contribution, which will be read and discussed. Since this will give rise to a discussion of sulphite liquor testing methods, we are also publishing a contribution from Dr. Rudolf Sieber, on the "Analysis of Raw Sulphite Liquor." Dr. Sieber forwarded this to the chairman and gave permission for its publication, since the last meeting.

The sulphite pulp committee expected to send out a questionnaire along the lines suggested at the last meeting, but this for several reasons did not meet with the approval of all concerned, the chief objections being that it was too exhaustive and probably would not meet with favorable acceptance on that account. It was thought preferable, if it is the intention to send out any questionnaires, to have them cover a phase at a time. A great deal of work is entailed in tabulating the data obtained, and if the committee can meet only once a year, and then only for a day, the result is that progress is very slow indeed, and even under those conditions nearly all the work must of necessity fall to the chairman alone. It is very difficult to obtain proper team work on a committee when only one meeting per year is held. Much of this work cannot be accomplished satisfactorily, even by endless correspondence. It is very desirable that the subject of a questionnaire be thoroughly discussed at this meeting. If a sufficient number pledge their response, the work will be undertaken.

Investigation of Lignin

The committee recognizes as a need for development in the industry a more complete and exact knowledge of the constitution of lignin, because the sulphite process, or any pulp making process, must be regarded as a process for converting the lignin and encrusting matters of wood into soluble form. For this reason we are publishing in translation the fundamental researches of Dr. Klason on the constitution of lignin. These will serve as a foundation for future work in this field.

Prof. Dr. Klason sent these contributions to the chairman during the last year, and also granted his permission to us to publish them. Great thanks are also due one of our members, Engineer Carl Fineman, for his assistance in doing the main part of the translation work on these and the articles by Dr. Sieber.

Work for the Coming Year

It seems that it is advisable for the committee to select one or two distinct phases of sulphite pulp manufacture or testing and concentrate on those phases during the coming year. We might suggest for the association's approval the working out of a rapid and dependable method for determining residual lignin in unbleached sulphite pulp, for use in mill control.

Another subject that appears worth while investigation is a rapid method for the direct determination of the combined sulphur dioxide in sulphite acid, or combined lime. It seems this forms the main source of contention in all the controversies on acid testing. Discussion of these subjects is invited at this year's symposium.

The committee feels it would be a very valuable asset in pulp and paper manufacture to have a standard method for determination of alpha, beta, and gamma cellulose in pulp, and other chemical characteristics of pulp, but we feel this subject, because of its general value in sulphite, soda and sulphate pulp manufacture, could be handled to better advantage to the industry at large by a specially appointed cellulose committee. While some work has already been done in this direction, we wish to suggest the naming of such a committee.

(Additional reports will be published later)

Other reports included those of George K. Spence, chairman of the Soda Pulp Committee; of Ross Campbell, chairman of the Abstracts of Literature Committee; of J. C. Sanburn, chairman of the Beater Furnish Committee; of Clarke Marion, chairman of the Committee on Coated and Processed Papers; of Ross Campbell, chairman of the Committee on Dyestuffs; of E. C. Tucker, chairman of the Joint Committee on Testing Pulp for Moisture; of Frederick C. Clark, chairman of the Committee on Paper Testing, and N. Folke Becker, chairman of the Committee on Standard Methods of Testing Materials.

The remainder of the Technical Association sessions was given over to the reading of papers and discussions on same.

Annual Dinner

The annual dinner of the Technical Association was given in the North Ballroom of the Hotel Astor Tuesday evening, with about 275 members and guests present. The dinner this year established a precedent in that for the first time ladies were present. Judge Charles F. Moore, of the Seaman Paper Company, New York City, as usual acted as toastmaster, and in his characteristic way introduced the several speakers.

Vocational education was the keynote of most of the speeches. J. C. Wright, recently elected director of the Federal Board of Vocational Education, outlined the importance of vocational educational movement and the plans being followed toward furthering it. O. F. Bryant, president of the Technical Association of the Canadian Pulp and Paper Industry, and L. M. Alexander, president of the Nekoosa-Edwards Paper Company, Nekoosa, Wis., gave short talks, and Frank Gilbreth, lately returned from Czecho Slovakia, spoke interestingly on the improved industrial methods that have been adopted in that country. Because of illness, Dr. Otis W. Caldwell, who was to speak on the subject of "The Scientific Mind," was unable to be present, and Dr. David Snedden, professor of sociology at Teachers College, Columbia University, appeared in his place. Dr. Snedden spoke at much length on the value of vocational education and the growth of the movement in all parts of the country. He also dwelt on prevailing industrial conditions.

At the end of the speechmaking Judge Moore congratulated President Williamson and F. T. E. Sisson, of the Racquette River Paper Company, Potsdam, N. Y., who had charge of the entertainment program of the dinner, on what he termed "the most enjoyable banquet ever given by the Technical Association."

Salesmen's Association Meeting

THE annual meeting of the Salesmen's Association of the Paper Industry was held in the Roof Garden of the Waldorf-Astoria Hotel, New York, on Tuesday, April 11, with President H. H. Reynolds presiding. Morning and afternoon sessions were held, both of which were well attended.

At the annual election, the following officers were elected for the coming year:

President, H. H. Reynolds, of the B. D. Rising Paper Company, Housatonic, Mass., re-elected.

Secretary and Treasurer, Dr. Hugh P. Baker, of New York, re-elected.

Vice President for New England, J. Hussey, of the International Paper Company, Boston, Mass., succeeding Arthur E. Ford, of the Chemical Paper Mfg. Company, Holyoke, Mass.

Vice President for New York, Donald MacLaurin, of the Liberty Paper Company, New York City, succeeding L. B. Steward, of Waring & Steward, New York City.

Vice President for Chicago, J. L. Fearing, of the International Paper Company, Chicago, re-elected.

Vice President for the Miami Valley, R. T. Houk, Jr., of the Mead Pulp and Paper Company, Dayton, O., re-elected.

Addresses

In his annual address President Reynolds spoke of the mark which the Salesmen's Association is making for itself, and the growth of the organization during the past year.

Laurence H. Sloan, of the Standard Statistics Service, delivered a very interesting and instructive address on "The Salesman as an Evangel of Better Business," which is published on another page of this issue.

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T. J. Burke, secretary and treasurer of the Cost Association of the Paper Industry, then spoke on the subject of "Cost and Selling," as follows:

COST AND SELLING

"MR. CHAIRMAN AND GENTLEMEN: Since I am here through a suggestion I made to your secretary, I feel that it is up to me to try and tell you something worth while. My selling experience has been confined to selling life insurance, which I did for a short time fairly successfully. My experience as an accountant is more extensive, so putting one against the other, you will see that on this subject of costs and selling, I probably know more about the costs than I do about the selling.

"I attended the last luncheon held by your New York Division, at which two of your members touched on a subject in which the Cost Association is vitally interested, namely, selling below cost. I must choose my words carefully here, because none of us want to do anything or say anything that can in any way be considered illegal. However, we are allowed to talk about costs, and we are allowed to talk about selling. At the meeting referred to, one statement made was to the effect that a reduction of as much as a cent a pound usually in the experience of the speaker making the statement caused a falling off in business rather than an increase in orders, because it had such an unsettling effect on buyers in general. They naturally reflected that if manufacturers could afford to make such a big reduction at any one time, they would probably in the near future make still further reductions and therefore desisted from placing further orders in the hope that they would later get a still better price, whereas if only a small reduction were made the buyer was inclined to place his orders believing that the reduction was made just because business was dull and as soon as it picked up the price would snap back to its original level. The Cost Association believes this level should never be below the cost of production and would never be below this level if all mills really knew what these costs are. Unfortunately they don't, that's why the Cost Association is in existence.

"The second statement made at this meeting was very interesting indeed to me because it was made by a representative of a mill which has supported the Cost Association from its inception. This salesman stated that when he went calling he was hailed as the high price salesman. His talk was to the effect that his company refused to pay a bonus to their customers for buying their paper and that any salesman worthy of the name would not expect to make a living by giving away his employer's money. We all know what a difficult proposition it is to obtain good orders in these days, although I believe there has been some slight improvement in this respect the last few weeks, but after all, does not the art of salesmanship consist in convincing prospective buyers that the seller is only seeking to make a fair profit on the articles he is selling and therefore that the prices being charged are reasonable? Now in order that the salesman may be in a position to carry conviction to the buyer, it seems to me that it is advisable for him to be placed in possession of certain facts regarding the manufacturing costs. Is it not a fact that in the case of two salesmen whose personalities and persistence are equal, one would have a big advantage over the other if he were well acquainted with the processes used in manufacturing the products he was selling and their manufacturing costs, whilst the other fellow knew little about them and was attempting to make sales without this knowledge?

Cost Knowledge Helps Salesman

"During the business depression last year I know that in one particular instance a gentleman who has been very active in the affairs of the Cost Association went out selling and he has assured me that he was on many occasions able to close deals because with his cost knowledge he was able to convince customers that the prices he was quoting did not include an exorbitant profit and he did this by explaining the methods used by his mill for calculating their manufacturing cost. Of course, salesmen generally should not be expected to go into detailed costs, but the thought I have in mind is that it would be of assistance to them in these difficult times if they were supplied with figures showing the different items entering into the cost of the products they were selling. So much for the individual salesman.

"Now as to the Sales Department as a whole. I want to make an appeal to sales managers in general to assist the Cost Association. This may sound a rather strange request. Let me explain. For the past year, the Cost Association has been dwelling particularly on the importance of close co-operation between the different departments in a mill. We have been suggesting, and, of course, in many large mills it is the practice that periodical meetings presided over by the Executive should be held for the purpose of discussing any difficulties which may arise and threshing out any disputes which may develop between the various departments; these meetings to be attended by the Superintendent, Purchasing Agent and the Sales and Cost Managers. Now we all know that there is sometimes friction between the sales manager and the comptroller or cost manager, and perhaps this has been due partly to the fact that in many of these cases the sales department has not received from the comptroller's department the information that it should have. The main contact between these departments undoubtedly starts with costs and it is because in many cases the cost figures supplied have either not been dependable or not easily comprehensible that friction has arisen.

"Perhaps you will allow me to make the following suggestions regarding information you should receive:

"Daily statements showing number and value of orders received and names of buyers, also weekly reports listing all sales, returns and allowances, together with comprehensive figures for same period for previous month and to date. Incorporated with report should be a statement showing the new business and the status of 'unfilled orders.' In addition a monthly report showing gross profits for the month completed and the year to date with comparisons for the same period of the preceding year. Of course, the sales department should also be supplied with figures showing clearly the finished stock inventory, as well as 'in process' items and 'raw material' stocks by months. Another statement very useful to the sales manager shows sales by territories, since from it he can readily inform himself regarding the prospects of increasing sales in the various territories and this brings up another interesting point, namely, the cost of selling. Are you, and I am speaking particularly to sales managers, getting sufficient information or information arranged in such a way as to enable you to form a correct judgment regarding the profits being made in the different territories? I mean information such as this by territories:

"1. Total sales.
"2. Salesmen's salaries and commissions paid.
"3. Traveling expenses.
"4. Office expenses.
"5. Percentages to sales of traveling expenses, commissions and salaries and total expenses.

"Similar information regarding each individual salesman.

Sales Expenses

"Before closing I would like to touch on a touchy subject, namely, disputes regarding sales expenses. I would ask the sales managers to remember that most of the heads of the accounting departments at this time particularly, have a difficult job because their instructions are to cut expenses to the bone and they naturally scan each item of expense very carefully. It is because of the disallowances of some of these sales expense items as well as because the sales department perhaps rightly sometimes considers the cost figures given are not dependable that many disputes arise between the sales and accounting departments. I would therefore urge that the heads of these departments make a real endeavor to know each other better.

"There is the greatest necessity now for real co-operation between these departments, and I believe that the only way to secure such co-operation is to make an honest effort to understand the difficulties with which the other department has to contend."

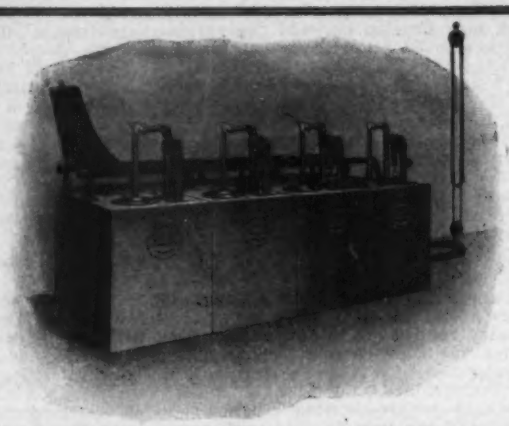
Herbert L. Schamberg, managing director of the National Council of Traveling Salesmen's Associations, speaking before the meeting stated that "as the youngest association to join the national council, I want to welcome the salesmen of the paper industry to the National Council of Traveling Men's Associations, to share in our efforts to correct wrongs and provide protection against injustices that may be practiced by railroads, corporations or any individual that renders service to traveling salesmen." Mr. Schamberg then reviewed some of the work of the council, and spoke particularly of the effort to secure an interchangeable mileage book. He said that selling campaigns had been cut down by the high cost of travel and told of the successful campaign to cut the cost of transfer of trunks in New York City.

The meeting then adjourned for a buffet luncheon.

At the afternoon session Professor Harry R. Wellman, of the Amos Tuck School, Dartmouth College, Hanover, N. H., delivered a speech on the subject "Selling Paper:"

(Prof. Wellman's Address will appear in a later issue)

H. R. Heydon, president of the National Association of Purchasing Agents, followed Professor Wellman, speaking on "Does It Pay to Buy Orders?" in which he discoursed at much length on the right and wrong methods of selling.



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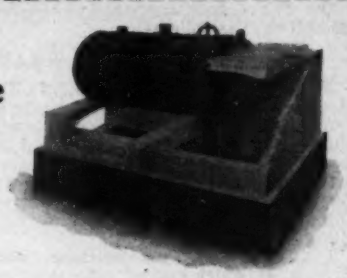

Better join up with this satisfied army of friends who know what a profitable move it is to eliminate poor combustion conditions, escaping heat and needless repairs with a permanent, modern setting of

"STEEL MIXTURE"

Settings of "Steel Mixture" reduce the joints more than two-thirds. Because they are smooth and with few joints they last more than twice the life of ordinary fire brick. These tested facts are worth considering.

Write us at once for "Book of Measurements" and information about Boiler Door Arches, Fire Box Lining Blocks, Back Combustion Chamber Arches, Blow-Off Pipe Protectors, Ignition Arches or Dutch Ovens. We ship from stock immediately; settings fitted to your exact requirements.

McLeod & Henry Co., Troy, N. Y.
New York Boston Detroit

SUPERIOR ROSIN SIZE

Paper Makers Chem. Co.
Easton, Pa.
Holyoke, Mass.

Western Paper Makers Chemical Co.
Kalamazoo, Mich.
Pensacola, Fla.
Jacksonville, Fla.

Size or System?

Do you require a "Sizing System"? Or would you prefer to use ROSIN SIZE so carefully adapted to your needs that no expensive system is necessary to prove its economy?

OVER 300 PAPER MILL OWNERS

regular users of "Superior" Rosin Size—pay tribute to the thorough knowledge of paper-making chemistry possessed by our experts.

Let us confer with you on this very important subject. Our chemists will advise you—freely, anytime, anywhere.

Annual Dinner

The annual dinner of the Salesmen's Association was given in the Roof Garden of the Waldorf-Astoria Hotel Tuesday evening. An informal reception was held at 6:30 p. m., and dinner was served at 7 p. m. Between courses there was dancing. The only speaker at the dinner was Congressman Dan A. Reed, who chose as his subject "The Turning of the Tide." Congressman Reed started by saying that as he was not properly equipped to speak on the paper business he would talk on the human interest topic of American characteristics and ideals. He told several stories illustrating the courage in the average American's make-up, and especially the American women. He gave it as his opinion that the laudable characteristics of Americans would carry the country through the present trying times, and he stated that already plenty of signs are apparent that the turning of the tide in business had set in.

Woodlands Section Meeting

THE annual meeting of the Woodlands Section of the American Paper and Pulp Association was held at the Waldorf-Astoria Hotel on Tuesday, April 11, at 10 a. m. After the business meeting and the rendering of reports, the election resulted in the naming of the following officials for the ensuing year:

Chairman, C. W. Hurtubis, of the Hammermill Paper Company, Erie, Pa.

Vice Chairman, Harry A. Fletcher, of the Fletcher Paper Company, Alpena, Mich.

Secretary and Treasurer, O. M. Porter, New York City.

Executive Committee, Messrs. Hurtubis and Porter; Robert S. Kellogg, of the News Print Service Bureau, New York City; Mr. Lauderborn, of the Pejepscott Paper Company, Brunswick, Me., and Mr. Sterling, of James D. Lacey & Company.

Secretary Porter outlined the plans of the Woodlands Section for the coming year, including the continuance of the quarterly pulp wood reports, the development of recommendations governing the purchase and sale of pulp timber in the various pulp wood regions, and also the development of plans for the application of forestry methods in pulp and paper companies' operations. Secretary Porter predicted a rise in pulp wood prices during the next several years because of scarcity of wood.

Ellwood Wilson, of the Laurentide Company, Ltd., Canada, pointed out the necessity of reforestation, and said that among the things accomplished by reforestation are the ready control of fires, insect depredations, more modern systems of transportation, utilization of more modern mechanical equipment and the easier determination of rotation wood crops.

The terrible losses being caused by the spruce bud worm in the pulp wood regions was evidenced when Secretary Porter called attention to a recent report by C. W. Robinson, Minister of Lands and Mines of New Brunswick, Canada, that crown timber worth $19,750,000 in stumpage dues has been destroyed by this worm. Mr. Robinson's statement was that four billion feet of fir and 360,000,000 feet of spruce on crown lands in New Brunswick have been destroyed.

Paper Jobbers Meeting

THE nineteenth annual convention of the National Paper Trade Association was held on April 10-12 at the Waldorf-Astoria Hotel, New York. At the business session in the Astor Gallery of the Waldorf on Wednesday afternoon the following officers were elected for the ensuing year:

President, C. N. Bicknell, of the Union Paper and Twine Company, Cleveland, O., succeeding E. F. Herrlinger.

Vice President in Charge of Fine Paper Division, Fritz Lindenmeyr, of Henry Lindenmeyr & Sons, New York City.

Vice President in Charge of Wrapping Paper Division, Frank W. Power, of Carter, Rice & Company, Boston, Mass., re-elected.

Treasurer, A. J. Corning, of Hubbs & Corning, Baltimore, Md., re-elected.

Secretary, William C. Ridgway, re-elected.

Treasurer Corning read his report for the year, which on motion was accepted with thanks. The Auditing Committee was then submitted and accepted.

A motion was made to amend the by-laws of the association whereby the word "wrapping" will be substituted for the word "coarse" was adopted. The reason for this change, it was pointed out, is that the word "coarse" is frequently used in the trade to mean an inferior quality of paper.

The meeting passed a resolution endorsing the Stephens-Kelly Bill now before Congress providing for the legalizing the fixing of re-sale prices by manufacturers under certain restrictions.

President Herrlinger read his report, in which he outlined present conditions in the paper trade, referred to existing trade customs and urged members to co-operate more fully through their trade organization.

Secretary Ridgway's report showed that the association had experienced a successful year, and that the present membership totals 343. The secretary urged that efforts be made to procure new members, and also made reference to the spotlight that has been thrown on trade associations in recent months because of Government decisions relative to such organizations. He expressed the opinion that members of the National Paper Trade Association had nothing to fear on this score as the operations of their organizations were entirely legal in every particular.

N. L. Martin, secretary of the Canadian Paper Trade Association, in a few words extended the greetings and good will of his organization and invited members of the National Paper Trade Association to attend the next meeting of the Canadian body to be held in Montreal.

Third Volume, Manufacture of Pulp and Paper

The third volume of the text books, Manufacture of Pulp and Paper, prepared under the direction of the Joint Executive Committee of the Vocational Educational Committees of the Pulp and Paper Industry of the United States and Canada, is now ready and being distributed by the McGraw-Hill Book Company, Inc., of New York City.

This volume comprises 716 pages containing nine sections dealing with the purpose of pulp wood; preparation of pulp wood; manufacture of chemical pulp; manufacture of sulphite pulp; manufacture of soda pulp; manufacture of sulphite pulp; treatment of pulp; refining and testing of pulp and bleaching of pulp. Each section is paged as a unit in numerical order. This arrangement is for the purpose of making it possible to secure any desired section for the use of correspondence study.

The Committee is to be congratulated on making such thorough progress.

After May 1st the New York office of THE PAPER INDUSTRY will be located in the Dodge Building, 57 Park Place.

A Decennial Record of The Forest Products Laboratory

A handsome and complete record of the Decennial Celebration of the founding of the Forest Products Laboratory, at Madison, Wis., has been issued by the General Committee which had the celebration in charge and concludes their activities.

The Decennial Celebration, of which the publication of this record is a part, was conceived as a mark of tribute to ten years of public service unique in the forest history of the world, and it was made possible by the contributions of over two hundred firms and individuals.

The plan of distribution followed in issuing the book provides approximately 1,500 copies to be sent to a list including prominent agencies in the forestry and wood-using field, mostly in this country and abroad. Trade periodicals, trade and technical associations, companies and corporations, forestry and engineering schools, and industrial research laboratories are representative of the field covered.

After this distribution there will remain several hundred copies which the committee has indicated may be disposed of by sale at cost, which is $1.75.

Appleton Men in New Paper Firm

Two Appleton men, T. Eugene Orbison and Prof. J. C. Lymer of Lawrence college, were signers to incorporation papers filed with the register of deeds of Winnebago county in Oshkosh recently for the White Rapids Paper Co. The third signer is Attorney Ed. M. Hooper of Oshkosh.

The company is capitalized at $200,000 and gives as its business the development of water powers, manufacture of paper and sale of surplus power as a private company. No immediate development or building plans are contemplated, organizers of the company state.

Sales Agents Wanted

to sell, as a side line on a commission basis, our "C-A-WOOD PRESERVER" (Carbolineum America), "PERFECTO-SOTE," Creosote, and "C-A" Red, Green and Brown Shingle Stains. C-A-Wood Preserver Co., Arcade Bldg., St. Louis, Mo.—Adv.

New Sand Filter

A SPECIAL filter for paper mills, producing all the results the paper manufacturer desires. It is a modification of the well known Hungerford filter adapted to paper mill use. It is constructed of concrete, strictly wrought iron pipe, brass strainers and especially prepared silica sand. It is as durable and efficient as can be built at any cost. It can be sold at a very low figure.

This filter gives perfectly clear water, washes thoroughly, does not require renewal of the sand bed, is absolutely reliable in the performance of its duty and requires a minimum amount of attention.

Send for full particulars

Hungerford & Terry, Inc.
CLAYTON, N. J.

BATHURST LUMBER COMPANY, LIMITED

PRICE & PIERCE, LTD.
17 East 42nd Street, NEW YORK CITY

ARE NOW THE

SOLE SELLING AGENTS
for Bathurst Pulp

Unbleached Sulphite 50 tons daily
Kraft Pulp 50 tons daily

Our pulp is made from Canadian Spruce
We ship in sheets, baled

BATHURST, NEW BRUNSWICK, CANADA

DIAMOND ALKALI COMPANY

MANUFACTURERS OF

Soda Ash 58% **Caustic Soda 76%**

Modified Sodas **Special Alkalies**

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BICARBONATE OF SODA, U. S. P.

Our complete Works, located at Painesville, Ohio, directly situated on three Trunk Line Railroads, are in position to serve you to advantage.

Address inquiries and communications to our general offices at

PITTSBURGH PENNSYLVANIA

Convention of the Superintendents and Cost Association

Committees have been appointed for the combined convention of the American Pulp and Paper Mill Superintendents Association and the Cost Association of the Paper Industry, to be held at Kalamazoo, Mich., June 1, 2 and 3, as follows:

General

Superintendents: J. H. O'Connell, International president; E. T. A. Coughlin, Allied Paper Company; N. M. Brisbois, Sutherland Paper Company.

Cost Association: Harry C. Bradford, Allied Paper Company; Thomas J. Burke, New York City; A. E. Reilly, American Writing Paper Company.

Resolutions

Superintendents: Ed. T. A. Coughlin, Allied Paper Mills; Michael Redmond, Kalamazoo Paper Company; Clarence Harter, Rex Paper Company.

Cost Association: George Ferguson, Watervliet Paper Company; Ralph Clark, Kalamazoo Vegetable Parchment Company; Paul H. Broesamle, Allied Paper Mills.

Reception

Superintendents: Jacob Parent, Western Board and Paper Company; W. H. Wightman, Lee Paper Company; Frank A. Johnson, Allied Paper Mills; C. H. Gilman, Bryant Paper Company; Clinton W. Ulrich, Wolverines Paper Company; S. A. Simpson, Allied Paper Mills; Clarence Thorne, Watervliet Paper Company.

Cost Association: Paul Broesamle, Allied Paper Mills; Goerge Jubb, Kalamazoo Paper Company; R. L. Strong, Lee Paper Company; Adrian VanderLinden, Sutherland Paper Company; George Ferguson, Watervliet Paper Company; C. E. Spangler, Eddy Paper Company; A. E. Endy, MacSimBar Paper Company; C. V. Kean, Jr., Handley-Knight Company.

Registration

Superintendents: George Pountain, Allied Paper Mills; Alfred Bryant, Bryant Paper Company; Clarence Harter, Rex Paper Company; Harry E. Urich, MacSimBar Paper Company; Otto Fisher, Bryant Paper Company.

Cost Association: Harry Barney, Allied Paper Mills; Clare Crowley, Allied Paper Mills; Jay F. Bachelder, Standard Paper Company; F. Brown, Michigan Paper Company; J. C. Handy, Michigan Paper Company; William Badour, Eddy Paper Company.

Transportation

Superintendents: Jacob Kuss, Allied Paper Mills; Charles Noble, Stamscott Fibre Company; Fred A. Smith, Mullen Paper Company; Luther A. Parker, Bryant Paper Company; Michael Redmond, Kalamazoo Paper Company.

Cost Association: William Allen, Bryant Paper Company; W. H. Oliver, Allied Paper Mills; Ralph Clark, Kalamazoo Vegetable Parchment Company; Platt Glezen, Allied Paper Mills; R. C. Simpson, MacSim Bar Paper Company; E. T. Metcalf, Standard Paper Company; Robert L. Wall, Standard Paper Company.

Luncheon

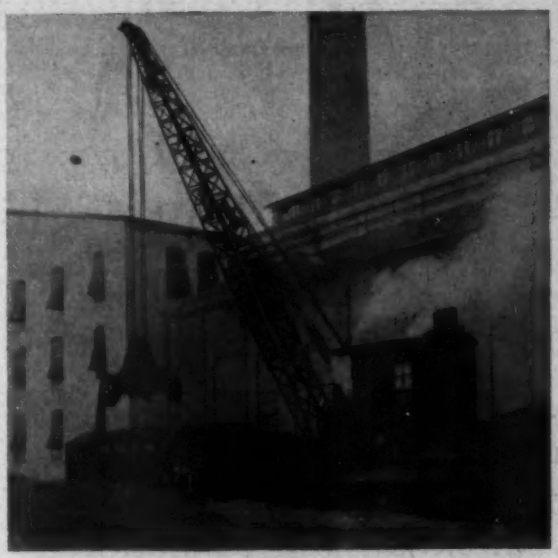
Superintendents: A. W. Wightman, Hawthorne Paper Company; Peter F. Denner, Kalamazoo Paper Company; Albert H. Parker, Allied Paper Mills; William Reynolds, Kalamazoo Paper Company; C. G. McClellan, Kalamazoo Vegetable Parchment Company.

Cost Association: Elbert G. Milham, Bryan Paper Company; Allen Milham, Bryant Paper Company; G. T. Ingling, Kalamazoo Paper Company; Peter F. Bosker, Rex Paper Company; L. N. Russell, Wolverine Paper Company; Harold Westenheiser, Allied Paper Mills; Harry Hummell, Sutherland Paper Company.

Paper Industry Secretaries in Trade Association Discussion

The paper industry has led all other industries in the presentation of the problems of the paper industry in a symposium which has been printed in daily installments in the New York Evening Post. Several secretaries of paper associations have discussed various features of the trade association problem, the dicussion being based on the developments in Washington, where Secretary Hoover is endeavoring to secure wider recognition for the trade association as a factor in the promotion of American business.

Secretary Hoover himself led the discussion which began March 20, and was followed by O. B. Towne, secretary of the Waxed Paper Manufacturers Association, and other similar groups in the paper industry. Mr. Towne is a member of one of the important committees of the American Trade Executives Association. R. S. Kellogg was another to discuss trade



Our Best Labor-Saving Device

Writing us recently the president of the Kalamazoo Vegetable Parchment Co. said, "We appreciate very much the receipt of your catalog, as it gives us a good many ideas which we will undoubtedly incorporate into our new mill.

"We are mighty glad to know that you make other things beside locomotive cranes, one of which we purchased from you some years ago, and which we have found in every respect the best labor-saving device that we have about our entire plant."

If you are interested in the handling of materials we want to remind you that Brownhoist is also interested in this subject. Over 40 years of engineering and crane building experience can be yours on any handling subject. And perhaps we can give you some valuable information, as we did the above company.

The Brown Hoisting Machinery Co.
Cleveland, Ohio

Branch offices, New York, Pittsburgh, Chicago, San Francisco and New Orleans

BROWNHOIST

If---?

IF you are seeking in your distributor the qualities and characteristics that mean successful merchandising at a reasonable profit, the creation of increased demand for your product (providing you've got the "goods"); the establishment of mutual confidence and hearty co-operation; the constant practice of the doctrine of the *"Square Deal—as much to those from whom we buy as to those to whom we sell—including our associates—."*

If you're looking for all these — and more — (although we claim no monopoly of these virtues) please let us hear from you.

American Paper Mills Corporation

Everything in Paper and Kindred Products

Offices: 237 Lafayette Street
Warehouse: 295-301 Lafayette Street
Telephones: *Canal 3520
NEW YORK CITY

Do These People Buy YOUR Products?

CORRUGATED and SOLID FIBRE BOX MANUFACTURERS

PAPER and FIBRE CAN and TUBE MANUFACTURERS

ICE CREAM AND OYSTER PAIL MANUFACTURERS

FOLDING BOX MANUFACTURERS

SET-UP BOX MANUFACTURERS

If so, you will want the most complete and accurate list of them in the United States, Canada and Australia, contained in the 1922 EDITION just off the press, of the

DIRECTORY AND BUYERS GUIDE

OF THE

Paper Box and Allied Industries

The
Standard Reference Book of the Trade
Bound in Cloth
Five Dollars, Prepaid

PUBLISHED ANNUALLY *By*

Ravenswood Publishing Company

1810 Wilson Avenue
CHICAGO, ILL., U.S.A.

association work, showing how the News Print Service Bureau of which he is secretary co-operates with the consumers of the product of those mills.

Dr. Hugh P. Baker, executive secretary of the American Paper and Pulp Association told of the experiences he has had at Washington since coming to the paper industry, and advocated a better recognition by the government of the place of the trade association in industry. E. H. Naylor, secretary of the fine paper associations whose book on trade association work is a text book for trade association executives, was the fourth of the group of paper secretaries to appear, all four discussing widely different phases of the whole big problem. Another of the series was Henry A. Wise, who has been counsel for several associations in the paper industry, as well as other industries.

Training Conference for Foremen

The success of the training conference for foremen held for the foremen of the Hammermill Paper Company of Erie, Pa., the second of the series of conferences being held under the auspices of the Federal and State Vocational Educational authorities, in co-operation with paper mills, has been such that it has been decided by the foremen who took the work, to continue their conferences for a longer period, without the aid of the federal and state authorities.

This is indication that the first conference series was a thorough success. The federal and state authorities volunteered their aid in the first series, which was for about twenty days of intensive work, but advocated that the work be not dropped when this series was ended, but be continued by the foremen and mill officials themselves.

The action of the mill foremen, therefore, is evidence that the value of the initial series was appreciated by the men who participated in the study. The foremen, moreover, have decided even after the conclusion of the second series, to maintain the study group which has been formed, by holding bimonthly conferences to continue as may be needed, special study of problems as they develop.

The home conference, as it might be called, which is to take place as the second step in the educational program, will consist of forty hours of work, but will be less intensive, and the hours will be distributed over a longer period than was the case with the initial period.

Book Paper Makers Oppose Duty on Casein

One of the big American industries has come out definitely against the tariff plan of the Agricultural bloc of Congress, in the filing of a protest by the paper industry against the placing of a proposed duty of 4 to 5 cents a pound on casein. The fact that to produce three pounds of casein takes 100 pounds of skimmed milk which would make nine pounds of powdered milk available for food is featured in the formal protest which was filed Monday by the American Paper and Pulp Association against the duty.

Casein is absolutely essential to the making of high-grade coated papers, the protest says, and it is impossible for the United States to make sufficient casein to meet the demands which are growing daily. There is available for use by domestic mills between 5 and 8 million pounds of domestic casein a year, while in 1920 there was imported 21,238,822 pounds.

"The book paper group of the paper industry," says the protest, "because of high cost of labor in printing, is in a very serious condition, running not much more than 50 percent of normal. With the market so dull in this country that many book paper mills are running a third to half time only and then at a loss, the addition of a tariff on raw materials would put many of the mills out of business, giving German and other European mills a greater advantage even than that they already possess over the American mills."

That dairymen have endeavored to discourage production of casein as an economic waste, compared with the amount of powdered milk that can be produced from the same raw material, is pointed out as an additional reason why no duty should be imposed to increase the prices which rose from 7 and 10 cents a pound in 1914 to 22 and 30 cents during the war.

Commission Asks Freight Rates on Paper

Rates on wall paper and some other grades of wrapping and bag paper from manufacturing points in Wisconsin, Minnesota and Michigan to destinations west and southwest and to general localities in the Mississippi valley have been held unreasonable and unduly prejudicial as between cities concerned by the Interstate commerce commission. This ruling is of considerable significance to the Fox river valley.

The commission after combining a number of complaints

Eliminates the Human Factor

Diamond VALV-IN-HEAD COST MORE WORTH MORE **Soot Blowers**

One of the appreciable factors in the efficiency and success of the Diamond Valv-in-Head Blower is that, compared to the independent valve soot blower, the number of manual operations is very greatly reduced and the opportunities for error in those performed are extremely limited. This is due to certain special features of design and construction.

Unit Full Floating—Any possible binding of the blower head, due to movement of the boiler under the forces of expansion and contraction, is prevented by a special mechanism which supports the unit in a spring suspension. As the blower head does not stick and bind, there is never any temptation to the operator to pass by certain units in his rounds, or to fail to operate the blowers at scheduled intervals.

With the Diamond Valve-in-Head soot blower system, a saving is effected of practically two-thirds in the actual length of pipe required. The elimination of expensive individual control valves in favor of the Valv-in-Head is an important cost consideration. This decreases the initial cost of these items by half or more, and reduces radiation losses from the soot blower lines by the same amount.

Reduction Gear and Ball Thrust Bearings—The reduction gear plays an important part in eliminating the uncertainties of the human factor. Boilers are only effectively cleaned when the steam jets play on the tubes for a pre-determined period of time. With the independent valve soot blower there is no means of controlling this time. The operator may revolve the unit as fast or slow as he pleases. Nine times out of ten he pleases to go too fast, with the result that the cleaning is not as effective as it should be. With the Valv-in-Head Soot Blower the reduction gear so regulates the speed of the blower element, and the ball thrust bearings minimize friction to such an extent, that improper operation is practically impossible, and all tubes are equally and thoroughly cleaned.

Elimination of the human factor is only one of eleven important advantages of Diamond Valv-in-Head Soot Blower. Every boiler needs a mechanical soot blower and you will save money by buying the best.

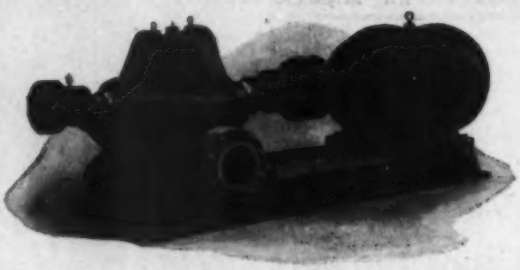
Diamond Valv-in-Head Soot Blowers are described and illustrated in detail in our new Bulletin 297. Write for your copy.

DIAMOND POWER SPECIALTY CORP.
Detroit, Michigan

Diamond

SOOT BLOWERS - SAVE 4 to 8% FUEL

Aurora Centrifugal Pumps



Type OMD

Aurora pumps are made in many types, to meet all conditions found in the paper mill field.

We specialize in horizontally and vertically split open and inclosed impeller, single and multi-stage and deep well turbine centrifugal pumps as well as deep well reciprocating pumps.

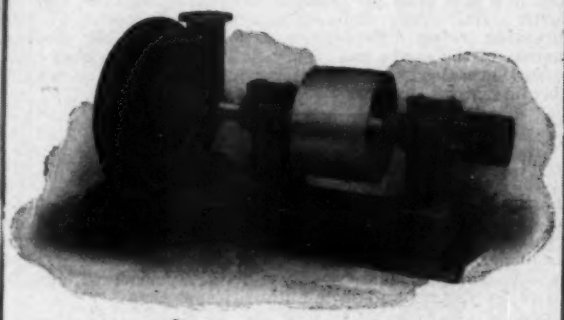
A card from you stating your conditions places our engineers at your service and results in a saving to you.

AURORA PUMP & MFG. CO.

Home Office and Factories, Aurora, Ill., U. S. A.

CENTRIFUGAL PUMPS

for

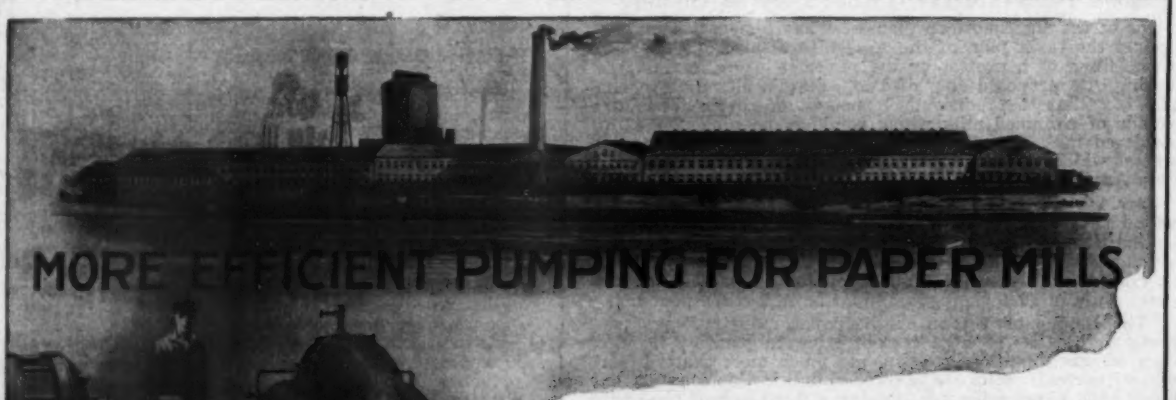


Water, Acid and Stock

Manufactured By

E. M. Cross Mach. Co.

BERLIN, N. H.



Frequently a single large pump can replace a large number of smaller pumps and will save considerable horsepower. Our engineers will gladly assist you with your pumping problems.

ALLIS-CHALMERS

MILWAUKEE, WIS. U.S.A.

objecting to the paper rates held that the entire structure of freight rates on the particular types of paper mentioned in the territory concerned should be modified. After laying down the general principles which it was held should govern the manufacture of a new rate structure the commission gave railroads permission to maintain present charges until June 1, 1922, but to have in readiness on or before that time, a new schedule which the commission allows to go into effect if it is found satisfactory and approved.

Urge Tree Planting in New York State

The assistance of the New York Forest Club, consisting of technical foresters in and about New York, was pledged to the support of the New York State Forestry Association, at the monthly meeting in New York City, at which speakers for the State Association told of their plan to make a state-wide drive for the reforestation of the State's idle lands. Leaders in the forestry fields representing both the lumber and paper industries were represented, including Dr. Hugh P. Baker, Secretary of the American Paper and Pulp Association, one of the founders of the State Forestry Association, Julian Rothery of the International Paper Company, G. R. Birkelund of James D. Lacey & Company, extensive operators in timberlands, O. M. Porter, Secretary of the Woodlands Section of the American Paper and Pulp Association, and Maj. Barrington Moore, Secretary of the Ecological Society of America.

New England

Boston, April 1, 1922.

We note at this time that conditions among New England paper mills vary greatly. Instances have come to the writer's attention among the fine paper mills of this section where operations are full time and difficulty is being experienced to keep abreast of orders. In western Massachusetts a number of such cases may be found among the rag paper mills, but in the same localities where these things are reported there are other mills not 20 miles distant, sometimes in the same town, who are either idle or running a small percentage of capacity, with frequent shut-downs sprinkled in between.

A study of the situation convinces the writer that such conditions are reflections more of the salesmanship of the distributors of the paper, rather than a reflection of either price or quality. The latter two factors enter into the situation, but the most important factor in the success of mills with plenty of orders is the aggressive selling tactics of them and of the merchants who sell their paper. It was said early in the year that 1922 would reward fighters, and in New England we can see this prophecy borne out by conditions at present.

The S. D. Warren Company through its New England merchants have carried on an extensive advertising campaign in the daily newspapers of Boston which will run through May. Results are very evident. A number of printers in Boston interviewed stated that from 40% to 70% of the catalogue jobs passing through their shops, were being printed on Warren Standard printing paper. Similarly, old Hampshire bond, a famous paper made by the Hampshire Paper Company, of the town by that name in western Massachusetts, have advertised the quality of this famous watermark, and right here in New England this boosting has resulted in more business, and greater activity at their mills.

Prices of paper have shown weakness right through the past month, particularly on sulphite bonds, m. f. book, and wrapping paper.

Kraft mills are or have been all on part time this past month. They cut prices in two instances, but no material change in the amount of orders or the activity of the mills was reported. The paper board mills ran about 50% of capacity through March in New England, and complete closings for a week at a time were not infrequent.

Paper Mill Supplies

Uppermost in the minds of every purchasing agent among New England paper mills is coal. The strike has begun and while assurances of an early resumption of operations have been given by the operators, the situation from the New Englander's standpoint is not so serene as we were told. Stocks of coal are plentiful up this way, both in dealers' and in consumers' bins and yards, but in the event of a protracted strike we begin to fear that the West Virginia fields will not prove the sure source of supply that was thought. Practically all coal consumed in New England has been from West Virginia mines for some months owing to the considerably cheaper price quoted. This reverses the situation that prevailed before and up to the end of the war, when Pennsylvania all rail coal was stoked everywhere except at seaboard. We have been depen-

Stuff Chest Records Worth Having

Foxboro Liquid Level Recorders are widely used in progressive paper mills because they produce clean, legible, permanently accurate records of the volume of stock in the stuff chests.

These records give you information on beater operation which can be obtained in no other way. They tell exactly when each beater is dropped. The curves also indicate rise of level of the stuff, providing that the same kind of stuff is put through the beaters, and show clearly any variations in consistency due to the use of too much water in washing down the beaters.

Foxboro Liquid Level Recorders are built and tested to withstand long, hard service. Though exceedingly accurate they are not delicate and do not readily get out of order.

Write to Dept. BB for Complete Information

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New York Chicago San Francisco Tulsa
Pittsburgh Philadelphia Birmingham
Peacock Bros., 179 Delorimier Ave., Montreal, Canada

FOXBORO
TRADE MARK

118-128

Cleveland WORM GEAR REDUCTION UNITS

Cleveland Worm Gear Reduction Unit Driving No. 2 Lannoye Pulper in Paper Mill

Get the Information on DRIVES Now

The many inquiries received by us indicate a wholesome and enthusiastic interest in improved speed reduction devices. Certainly never before has there been keener interest in efficient performance and permanent economy.

People buying now or planning to invest are carefully considering permanency and seeking constant efficiency. This naturally leads them to investigate Cleveland Worm gearing. They are amazed at the wealth of favorable evidence we have accumulated.

Frankly, many folks used to think worm gearing sort of an experiment. They weren't sure whether or not it would "pan" out. They have been sitting on the side lines as it were, watching the other fellow play ball. It is all changed now. And it's because the buyers who bought one unit invariably came back for more. Concerns of national reputation and high efficiency came through with orders for one—five—ten—fifty and so on. It usually starts with one and it takes plenty of time. That's why we suggest that you begin to get information **now.**

We don't ask for anything more than a sample order. All we seek is opportunity to have the Cleveland worm gear reduction unit **prove its own case in your factory.** That's why 76% of 1921 business was repeat orders. Why not write us today?

The Cleveland Worm & Gear Co.
America's Worm Gear Specialists
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New England Representatives
FRANKLIN MACHINE CO., Providence, R. I.
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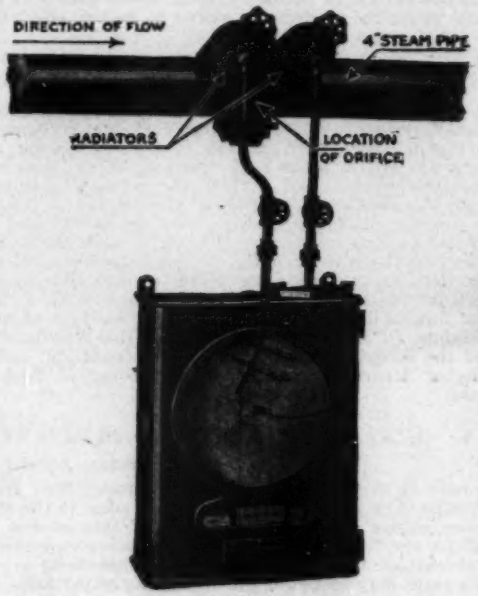
ALFRED H. COATS CO., San Francisco, Cal.
Rocky Mountain States Representatives
THE VULCAN IRON WORKS CO., Denver, Colo.

Bailey Fluid Meter



PRACTICAL —— ACCURATE

This shows the Bailey Fluid Meter complete for the measurement of steam. It consists of the Monel metal orifice installed between a pair of flanges, radiators and valves tapped into the pipe on the inlet and outlet sides of the orifice and pipes connecting these to the recorder.

Bailey Fluid Meters are easily and cheaply installed as changes in piping are not required and the accuracy is guaranteed.

They are the most practical and satisfactory meters for recording and integrating the flow of steam to turbines, digesters, paper machines and other processes. Steam can be measured at any pressure and temperature, exhaust steam included.

Either pressure or temperature recorders, or both, may be added to record on the same chart as the rate of flow.

Our engineering department is ready to suggest the proper equipment for your service.

The BAILEY METER COMPANY
2023 East 46th Street, CLEVELAND, OHIO

dent on non-union fields in West Virginia, but we hear disquieting rumors of this coal being diverted to the west and also of a large walkout in those districts, where non-union conditions prevailed.

However at this writing prices for New River and Pocahontas continue to be quoted at $6.25 f. o. b. the docks in Boston, which is practically unchanged.

Very little trading in pulpwood has been done this year. Stocks of wood are generally quite heavy, but a few sales were effected based on a $12 price f. o. b. point of shipment. About half the usual amount of pulpwood will have come down the Penobscot river this year, in Maine.

In Waste papers, business has fluctuated, board mill grades such as mixed papers and news having sold as high as $15 to $16 delivered. At present mixed papers are quoted at $8 f. o. b. Boston rate of freight point or $10 on folded news. Hard white shavings have occasionally brought $3.75 shipping point, while soft shavings are selling consistently at $3 to $3.10. Heavy book stock has sold at widely differing prices this month some of the best packings of uncoated stock fetching $1.85 and over delivered Fitchburg mills. The ordinary run of No. 1 heavy book stock with not over 3% of ground wood is quoted at $1.50 to $1.55 delivered Massachusetts mills.

Rags have of course taken a material slump in price. We note however that many special packings which are made to order, are bringing unchanged prices. Roofing rags are selling in New England at this writing at $18 to $20 delivered the mill, and very little moving even at that low range.

Mixed strings are weak although they move to New England mills in practically unchanged quantities, more are available however, and sales at $1.15 to $1.20 delivered are reported locally. Manila rope has strengthened perceptibly, and imported stock has sold ex docks this city for 4.10, while domestics in numerous instances have brought 4½c shipping point.

Graphic Arts Exposition

Paper manufacturers who overlook the Graphic Arts Exposition at Boston this year fail to appreciate its advertising value, particularly for their mill brands. Educational as the exhibit is expected to be, with thousands of superb printing samples to be shown, and vast numbers of pieces of printing, engraving, and lithographing machinery, the Exposition has nevertheless a far greater meaning for the paper manufacturer in its possibilities of promoting sales. Gathered here the last few days of August and the first of September will be printers and other consumers of paper from every part of the United States and Canada. Their potential purchasing power will be enormous, and far sighted paper makers have taken time by the forelock and engaged some of the most effective spaces in Mechanics Building, Boston, where the Exposition will open late next August.

Joseph Dallas, 10 High street, Boston, is the General Manager of the Exposition. Mr. Dallas reports such telling exhibitions assured as the expressive papers of the Strathmore Paper Co., the American Writing Paper Company's famous Eagle A. Brands, the A. M. Collins Manufacturing Co., the U. S. Envelope Co., and the S. D. Warren Co.

Extension of Free Dock Time Makes Congestion

Congestion of freight at Mystic docks, Boston, has been so heavy during the past two months that at least one steamer usually berthing there was obliged to seek accommodations at another terminal. The amount of new business brought to these docks was due to the liberal policy of the Boston & Maine Railroad in extending the free time on the docks from six to fifteen days.

Woodpulp comprised a large percentage of the new business brought here as it is usually imported before being sold. Consignees therefore welcome the fifteen days' free time in which they can arrange a sale of the pulp before demurrage charges begin. Baltimore railroads have allowed this extra free time and have thereby attracted much business. Importers state that as much as 40,000 odd tons of woodpulp brought to Boston within the past six months would have gone to Baltimore if the Boston & Maine had not extended their free time. Complaint of the congestion caused by these heavy imports failed to receive favorable consideration because local pulp importers have found it of such great assistance.

Charles C. Springer

Charles C. Springer, Vice-president of the Mt. Tom Sulphite Company of Holyoke, Mass., and a director in the Russell Company of Boston controlling paper and pulp mills, died at the Hotel Vendome, Boston, where he had been staying, early in March. Mr. Springer was associated with the late William

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CAUSTIC SODA 76%
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for
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PORT HURON SULPHITE AND PAPER CO.

PORT HURON, MICH.

MANUFACTURERS

Mitscherlich Sulphite **Machine Glazed Paper**

1888-1922

Russell Sr. in the introduction of woodpulp, into paper manufacture in the United States. He was born in Livermore, Maine, educated at Bowdoin College, and occupied for a time the chair of Henry Wadsworth Longfellow at Bowdoin. Going abroad for his health, he became interested in the manufacture of sulphite pulp.

He returned to this country and interested Mr. Russell in the matter and again went abroad to study pulp making more extensively. The two men then built the Mt. Tom mill for the manufacture of bleached sulphite. It is interesting to note that newspaper publishers were averse to using the wood pulp paper and only after it had been substituted for other paper in a shipment to the Boston Herald did the publishers become convinced of its quality.

The Oxford Paper Company issued $5,000,000 first and refunding mortgage 6% gold bonds this month and followed this shortly with $3,000,000 first preferred shares of stock. The bonds furnished the funds for the purchase of capital stock of the Rumford Falls Power Co., which owns and operates the entire electric and hydraulic development at Rumford, including a modern hydro-electric plant, with a present installed capacity of 31,000 horsepower. The Company by this purchase acquired what is probably the largest hydro-electric plant with the exception of Niagara Falls east of the Mississippi River. The Company in announcing the issue of the bonds states that it controls a large acreage of spruce and fir timber in Maine sufficient to last the Company for 100 years. It is understood that both issues were quickly subscribed. Lee Higginson of Boston issued the stock.

It is now understood that in the proposed reorganization plan of the Cushnoc Paper Company and the Kennebec Paper Company, the two concerns will be merged and that stock in the combined company will be offered creditors in lieu of their claims, as the best hope of securing larger returns on the division basis. It is hoped that by this reorganization a permanency of operation will be brought about. More than four hundred claims have been presented by creditors of the bankrupt companies. The liabilities of the Cushnoc Company as revised are $1,330,000 with nominal assets of $1,400,000 with the Kennebec Paper Company reporting indebtedness of $838,000 and the where-with-all to pay of $915,000 which is a nominal valuation of property and other assets.

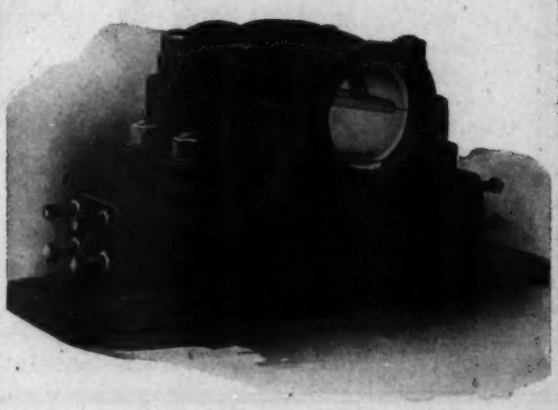
Manufacturers of paper containers who distribute their product in Massachusetts should inform themselves of the new ruling by the director of standards of this state requiring all paper and fibre cartons which are used for the sale by measure of viscous or semi-solid commodities or mixtures of solids and liquids to have printed thereon a statement of their capacity in terms of Massachusetts standard liquid measure, with the words "Approved by the Director of Standards for Massachusetts", and a list of the commodities for which such cartons may be used as legal measure. This does not apply to plain paper cartons, used only as containers for commodities, the quantity of which has been determined by sealed weighing or measuring at the time of sale.

A little monthly journal published by the Spruce Wood Department of the Great Northern Paper Company completes its first year with the April issue. It has had for objects the improvement of relations between the men in the woods and the management, the providing of clean and entertaining reading matter for the men cut off from the outside world, and the dispensing of interesting personalities regarding employees. In every way it has succeeded. The Great Northern Paper Company is engaged in taking a moving picture depicting the manufacture of newsprint from the rough standing timber to the finished rolls.

The S. Y. Beach Paper Company of Seymour, Conn., which closed its plant last May, now has 80 men at work. H. J. Farren, vice-president, considers the outlook good for uninterrupted production. At present the production is pin and textile papers. The Company is making extensive alterations and repairs both in the factory buildings and in the mechanical equipment, and engineers have inspected the dam with a view to rebuilding it. Since the factory was closed, the Company has been reorganized. Mr. Farren has been in the paper manufacturing at Erving, Mass.

The G. A. Robertson tissue paper mill at Hinsdale, New H., which was destroyed by fire last October, is being rebuilt by the G. E. Robertson Co. Latest type machinery will be installed and room will be left for the addition of more

Lining up your Main Shaft



and keeping it in line is made comparatively easy with this combination.

It is an Extra Heavy, Rigid Pillow Block, Mounted on a Wedge Adjusting Base Plate. Adjustable both vertically and longitudinally.

The Bearing may be either Ring Oiling, Wick Oiling or Chain Oiling, whichever you prefer. The Babbitt lining is finished accurately to shaft size and ends of bearing are faced for collars.

This is only one of the twelve different styles of Pillow Blocks we manufacture. If you are interested in any kind of pillow block, we have it, as well as any other appliance for the Transmission of Power by Belts or Ropes.

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We wish particularly to call your attention to two especially good products for paper

Newport Fast Blue R W
Good to Light

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Level Dyeing, High Tinctorial Power.

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Expensive motors and apparatus must be guarded. Dependability and accuracy are absolutely necessary. This fuse plug is absolutely foolproof. A simple unit —only three parts—takes but a few seconds to remove the blown element and replace it—no tools required. And, you know that it will function when it should. The powder-packed renewable cartridge eliminates all possibilities of fire on short circuit Will withstand more blowouts than any other fuse plug on the market. No porcelain to break.

A remarkable new invention having all the safety, dependable and economical features of the famous FEDERAL RENEWABLE FUSES and the FEDERAL-NATIONAL MULTIPHASE TIME LIMIT RENEWABLE FUSES.

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TIME LIMIT · POWDER PACKED
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machines later. One machine will start production this summer it is hoped. Robertson tissue paper mills predominate in this little town, and Mr. George E. Robertson, the treasurer of the Company rebuilding the old plant, is one of the family which owns most of the paper mill property in Hinsdale.

One thing all New England paper makers desire fervently and that is reduced freight rates on pulpwood. It is actually true at present that Canadian manufacturers, very largely owing to the lower rates enjoyed by them in Canada, are able to manufacture bleached sulphite pulp and undersell even Maine pulp mills. A 10% reduction is the very minimum required to put New England pulp mills on an even footing, inso far as transportation is concerned, with their Canadian competitors.

Stuart W. Webb made public from the Boston offices the operating profit and loss account of the Eastern Manufacturing Co., in 1921. It showed a loss of $1,201,000 compared with an operating profit of $1,156,000 in 1920. Mr. Webb, who is chairman of the Board of Directors, expresses satisfaction with conditions, stating that during February and March the Company's paper mills were running full capacity, while the pulp mills were about 65% active.

Importations of woodpulp were heavier than in previous months and are continuing large we are told. Although no figures since January are yet available, there were bleached sulphite pulps imported at Boston the first month of the year valued at $412,000, unbleached sulphite at $163,000 and unbleached sulphate at $87,000. The shipments originated in Norway, Sweden and Finland.

The suit that was entered recently in the Massachusetts state court against the International Paper Co., by the Beacon Oil Co., has been transferred to the Federal Court on petition of the former. The Beacon Oil Co. alleges a breach of contract as reported in this column last month. In its petition for removal to the Federal Court, the International Paper Co. denies all allegations.

The Luckenbach Steamship Co., which has transported considerable woodpulp from Canadian ports to Boston, has established a Boston office at 131 Board of Trade Building. The Company announces from this office that Canadian money will be accepted at par with American money in paying rates on woodpulp originating at Canadian ports.

As in other paper producing parts of the country there is much pulpwood in New England, that has been cut but not peeled. This wood was hewn during the era of high wood prices, and the slump caught much of it before it could be marketed. It lies in piles principally in the state of Maine, and a fair proportion of it is unbarked.

The Essex Paper Products Company of Lawrence, Mass., was incorporated under Massachusetts law in March with a $25,000 capital stock. They intend to establish a plant for the manufacture of tissues and specialty papers. Albert J. Quimby of Haverhill is president and Daniel J. Crowley of Lawrence treasurer.

A rather humorous incident was the guarding of a western Massachusetts paper mill by Government prohibition agents. It appears that the mill is making the special paper on which permits will be printed for the possession of liquor, or for its removal from bond.

Reports to Boston people state that the Reid-Newfoundland Railway Company of St. Johns, N. F., has abandoned its project of a newsprint mill along the Humber River on the west Coast of Newfoundland.

Showing that importations are still heavy, the tardy figures made public very recently by the Department of Commerce show that 1,930,000 pounds of paper stocks were imported through Boston in January.

Much New England made newsprint continues to find a receptive foreign market. In January, Argentina was shipped 1,602,000 pounds of news through Boston, and Cuba took 1,219,000 pounds.

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KNIVES

Made by the World's largest makers of Machine Knives, Simonds Barker, Chipper, or paper cutter knives are the last word in knife manufacture. They stay sharp and do not crack or break on the hardest kind of work.

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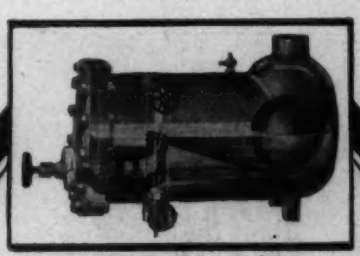

A Better Steam Trap for Paper Mills

Davis Traps are operating economically in paper mills wherever condensation is to be removed. In the illustration above, note the large float; sensitive leverage; valves and seats of Tobin Bronze; by-pass and working parts all attached to the cover and removable with it. Unusually long-lived. Write to the G. M. Davis Regulator Co., 414 Milwaukee Ave., Chicago, for details of the money-back guarantee.

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STEAM SAVERS SINCE 1875
SPECIALTIES

THE WATERBURY FELT CO.

SKANEATELES FALLS

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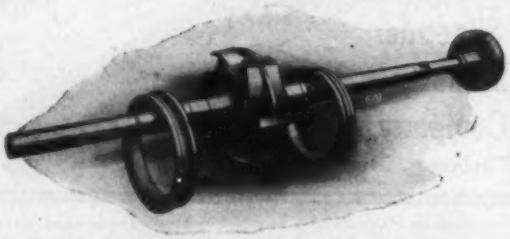
FELTS and JACKETS

Top and Bottom Wet Felts for board machines, with all the qualities requisite to insure long life and continuous production.

They Satisfy

Pumps Almost Anything—and Efficiently



IT IS NO LONGER necessary to use inefficient centrifugal pumps merely because they are simple and easy to clean. The efficiency of the De Laval open impeller shown compares favorably with that of closed impellers. For example in a recent test, an 8-inch pump, driven by synchronous motor, showed an efficiency from wire to water of 64% and a 10-inch pump an efficiency of 66%.

This open impeller was designed to handle paper pulp, and liquids containing rags, waste, etc., that would quickly plug a closed impeller. It gives practically no trouble from clogging under the most adverse conditions.

The pump shaft is encased in bronze sleeves and also protected by stationary sleeves to prevent strings, rags, etc., from wrapping around it. The knife-like sides of the impeller blades, running close to the side plates, shear or cut stringy materials.

The pump runs at speeds which permit direct connection to standard speed motors.

Both suction and discharge connections are in the lower part of the casing, and all internal parts are at once accessible upon lifting the casing cover and can then be removed after loosening the bearing caps. The parts are manufactured to limit gages on an inter-changeable basis, and replacements can be made by men of ordinary intelligence.

If you wish to pump liquids containing solids, submit full particulars, so that our Engineering Department can supply estimates with guarantees. Ask for Catalog B 82.

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Bars — Sheets — Structurals

Miami Valley

Dayton, April 1, 1922.

Among the opinions expressed during March by paper manufacturers in the Miami Valley was one given by a man who is a close student of economics and somewhat of a constructive pessimist, whose views are very carefully considered by other paper men on the rare occasions when he voices them. This man said that the mental attitude of the Miami Valley paper manufacturers seems to be less destructive than the collective attitude of paper manufacturers in other sections. The conversation which brought forth this comment dwelt upon the fact that paper mills in this section were not, apparently, in such straits as mills in some other sections of the country.

Manufacturers of magazine and book papers and of fine writings say that they are losing money on every sheet that goes out. Manufacturers of tissues, board, parchmentized and coated paper, on the other hand, say that they are taking a small margin of profit. Until the last few weeks, it has been difficult to secure an admission from paper manufacturers of the exact status of their affairs, but for some reason recently the paper men have been very willing to talk of exact percentages of loss and of their expectations for the coming year. Possibly the necessity of reckoning demanded by the income tax law has put them in a position to know with exactitude of their affairs.

There has been some talk recently among the paper manufacturers in this section of the advisability of putting before jobbers, printers and other buyers of paper, the definite figures concerning the cost of manufacturing paper, taking in all the steps from the wood to the finished sheet. When the scheme was talked over with the constructive pessimist just mentioned, he said that just as a muddy stream will clear itself in a little distance if not disturbed, just so must the price situation as concerning the paper industry be allowed to settle of its own accord, and that no amount of talk or publicity will stimulate buying to the place where the price of paper can be raised to include a fair profit for the manufacturer.

No concern was expressed during January and February over the lack of business, because manufacturers did not expect a large volume of orders during these months, but March has not shown the amount of business which it should, according to a comparison with previous years. The opinion has been expressed that the hardening of steel prices during March predicates a better condition in the paper market, inasmuch as steel prices are a primary barometer showing general business conditions.

At a number of the Miami Valley mills the statement was made with apparent willingness to talk, that last year's output varied from 50% to 75%, and most of these mills do not expect the 1922 demand for paper to exceed their output for 1921. One manager of a four machine mill said that if he could be assured that two of his machines would run steadily through the year, he would immediately shut his desk and take a vacation, feeling that a 50% production would be a good year's work.

The announcement has been made by the G. H. Mead Company, of Dayton, Ohio, that there would be no change in their price for newsprint before July 1st. Their price made on January 1st and which will be effective until July 1st is three and one-half cents.

Commenting upon the situation in his particular branch of the paper industry, a manufacturer of paper for tablets and papeteries said that the number of new mills built during the last three or four years for making this particular grade of paper were having a great deal to do with the small volume of orders he receives, and that this fact is very often overlooked in reviewing the situation. This was stressed as the reason for the difference between the demand for this kind of paper and the demand for tissues, board, parchmentized and coated papers.

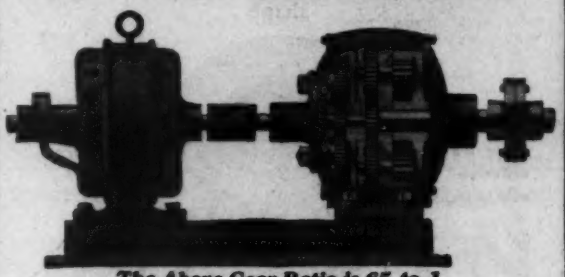
The general attitude of paper men in this section is one of watchful waiting. A number of them admit that the orders on which they are running were taken at prices below their actual cost figures, but that it costs less to turn out paper at a small loss than to let their mills stand idle. Thus they make a poor best of a bad situation. Even so, Miami Valley paper manufacturers are a cheerful lot of men.

Miami Valley Superintendents Meet

The Miami Valley Division of the American Pulp & Paper Mill Superintendents Association held their regular monthly meeting at the Elks Club at Middletown, Ohio, on the evening of April 1st.

The speaker of the evening was A. J. Beatty, who is in charge of the Betterment Department of the American Rolling

FOOTE
SPUR GEAR
SPEED REDUCERS
AND WORM GEAR REDUCERS



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Foote Speed Transformers overcome the objections caused by open back gearing, chains and belts for speed reduction. They eliminate costly belt, gear and chain replacement, and prevent delayed production.

Foote Design Provides Highest Efficiency

Foote Speed Transformer design gives highest efficiency, compactness, durability and strength.
Foote Speed Transformers are entirely enclosed, oil tight, dust proof and fool proof.
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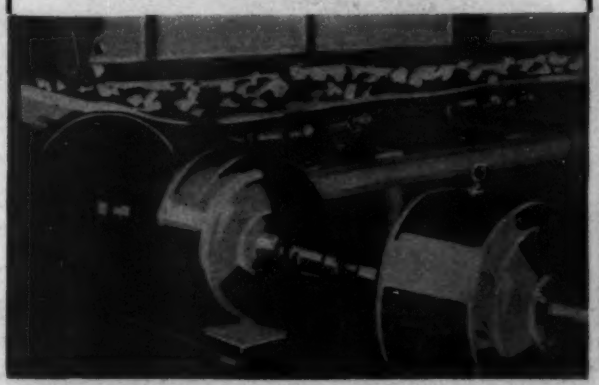

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Draper Hollow Balanced Brass Balls

FOR STUFF PUMPS

Absolutely balanced; will not pound out of shape

Specify these when ordering new pumps.

Order these to replace worn-out balls.

We make a specialty of repairing stuff pump balls.

We also manufacture—
SOLID BRASS BALLS
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VALVE FACING TOOLS

The Draper Manufacturing Co.

Port Huron, Mich. Petrolea, Canada

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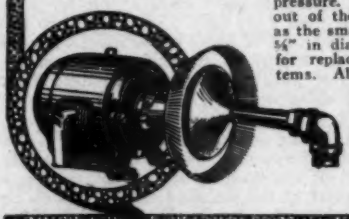
Clean, wholesome air, containing the proper proportion of humidity, conditioned to a comfortable temperature, is absolutely essential in industrial, office, public and school buildings.

The Bayley Turbo Air Washer

Supplies pure air by passing atmospheric air through a dense water spray to eliminate impurities, and through a conditioning chamber to regulate temperature and humidity. Uninterrupted service is assured by an atomizer that

WILL NOT CLOG

The Turbo-Atomizer (shown in the circle) distributes a fine spray evenly through the spray chamber at low water pressure. Impurities washed out of the air will not clog it, as the smallest water passage is 5/64" in diameter. An ideal unit for replacing fine orifice systems. Also for washing gases.



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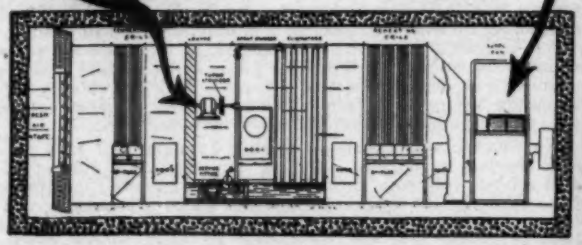

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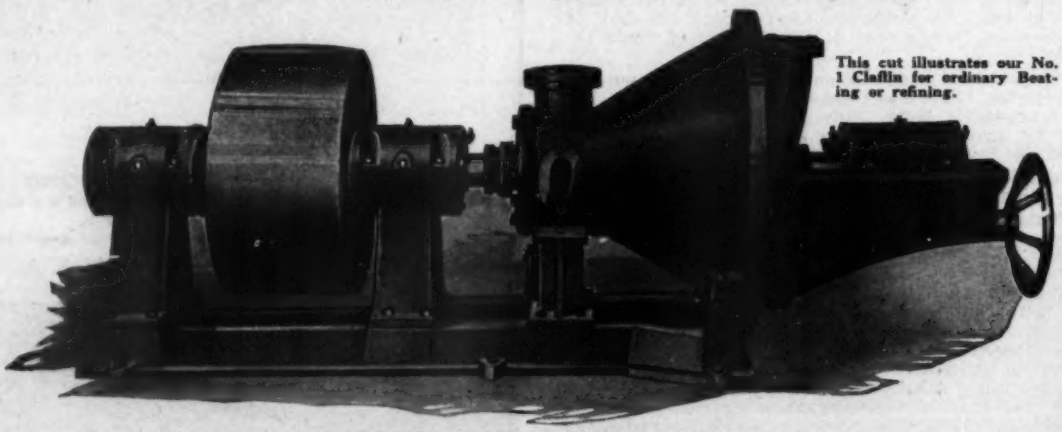
Increase Efficiency—Minimize Beater Troubles—Increase Production—Reduce Costs. They eliminate the necessity of Tub-Beaters or Jordan Engines and produce a more uniform product.



This cut illustrates our No. 1 Claflin for ordinary Beating or refining.

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THE CLAFLIN ENGINEERING COMPANY LANCASTER, OHIO

The Canadian Fairbanks-Morse Co., Montreal, Quebec, Our Canadian Agents

Mills, at Middletown, Ohio. His subject was the Training of Foremen. At the close of Mr. Beatty's talk, a motion was made and seconded that each superintendent bring his foremen to the next meeting of the superintendents, and that another speaker be secured to go even further into the subject of the training of foremen. Mr. Beatty's talk brought the realization of the great need for trained foremen. Most paper mill foremen are promoted from the ranks, and while they are first class workmen, they have not learned how, in most cases, to teach others what they know. This is the phase of the subject to be treated in the next meeting.

Walter S. Gregg, president of the Gregg Pump Company, of Kansas City, Mo., talked on the difference between the deep well propellor pump which is made and patented by his company, for use in connection with tubular wells, and the air lift pumps which are in use. Mr. Gregg invited the superintendents and their foremen to be guests at dinner preceding their next meeting, which is to be held in Hamilton on May 13th. The place of the meeting has not yet been decided upon.

Homer Martindale, of Shartle Brothers Machine Company, Middletown, Ohio, will act as secretary of the Miami Valley Association until the next election of officers, taking the place of Charles S. Stewart. Mr. Stewart has accepted a position as superintendent of the Newton Falls Paper Company, Newton Falls, Mass., and left on April 1st.

At each meeting, one of the superintendents offers one of his problems for general discussion. The question for discussion at this meeting was: "Which is the best Jordan to use on test stock where the requirement of the Jordan is not over one ton per hour, a large size Jordan similar to the large Miami, or large Horn, or a small Jordan similar to the small Horn or small Black & Clawson?"

The opinion in general seemed to be that the large Jordan would turn out the better stock, because the stock would be in the Jordan longer.

The chairman asked Tom Harvey, of the Gardner & Harvey Paper Company, to lay before the paper makers the proposition of financing the membership of the foremen in the superintendents Association, and also the trip which the superintendents and some of their foremen are to make to Kalamazoo in June, to attend the annual convention of the American Pulp & Paper Mill Superintendents Association. The cost was estimated at $50 per man from the Miami Valley.

Superintendents Server and Bishop form the committee to provide the speaker for the next meeting, and Superintendent Schenk is to work with Mr. Gregg in arranging for the dinner.

$300,000 Fire at Vulcanite Mill

Early on the morning of March 20th, fire demolished the saturating plant of the Vulcanite Mill of the Beaver Board Corporation, located at Franklin, Ohio, causing an estimated damage of three hundred thousand dollars. It is believed that the loss is more than covered by insurance, for a local agency holds policies amounting to $250,000 and there are other policies covering this building.

Asphalt for the saturating plant is heated during the night for the next day's run, and it is believed that one of these vats of boiling asphalt overflowed, setting fire to the floor. There is no night shift in the saturating plant except the few men necessary to watch the cooking asphalt. The fire broke out at five o'clock in the morning, and the employees fought the flames, believing they could overcome them. Three Vulcanite employees were injured before the local firemen reached the plant.

Calls were sent to the Middletown and Miamisburg fire departments who brought their apparatus to assist the Franklin department. The building which burned has only been completed and occupied for about two years, and when the fire was overcome, only one wall was left standing. It is believed that the machines in the mill were not damaged much except by water, for the machines were in the front part of the building, and the saturating plant, which burned, was in the rear.

Several carloads of finished shingles and roofing were stored on the second floor and the rear of the demolished building, and were completely destroyed by the fire.

Stacy Thornton, manager of the plant, was on the scene soon after the alarm was sounded, and directed the Vulcanite force until assistance came from the fire departments. About 75 men will be thrown out of work.

Charles C. Stewart Takes New Position

Charles C. Stewart, who has been for the past two years superintendent of the Harding Division of the American Writing Paper Company, at Franklin, Ohio, has accepted the

Standard Ultramarine Blues
For the Paper Industry
ASK FOR SAMPLE OF
NEOS R BLUE
The Highly Alum-Resisting Ultramarine
AGENTS
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THE WESTERN PAPER MAKERS CHEMICAL COMPANY
Kalamazoo, Mich.
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THE STANDARD ULTRAMARINE CO.
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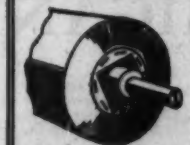
SERVICE
Wood Rolls

A Construction for Every Service

Free Blank Roll Blue Prints sent on request to any Paper Mill

Rodney Hunt Machine Co., 45 Maple St., Orange, Mass.

Like Tennyson's "Babbling Brook"

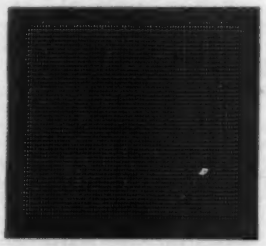
Men may come and men may go,
But the overhead on a Fourdrinier
Machine goes on forever.

The Fourdrinier machine may stop, but the overhead does not.

On a $200,000 Fourdrinier machine, the interest on the investment and depreciation alone amounts to $100 per day. Add to this the salary of the operating crew, rent and lost production, and the expense of shut-downs to change Fourdrinier Wires is tremendous.

A Fourdrinier Wire that runs straight and true, that will wear longer and require less frequent replacement, saves time and money.

To assure paper mill superintendents a uniform quality of pulp and minimum of shut-downs for replacements, Tyler Fourdrinier Wires are woven from a special composition wire. Tyler Wires run straight and true — they are made in all widths up to and including 250-inches. Send for a sample.



THE W. S. TYLER COMPANY, *Cleveland, Ohio*

Manufacturers of Fourdrinier Wires, Cylinder Faces, Washer Wires and Corduroy Cloth

"MICHIGAN" Combination Steel and Wood Pipe

LONG DISTANCE CONVEYOR OF WATER AND PAPER STOCK IN PAPER AND PULP MILLS—Specially Adapted to Carry Sulphite, Ground Wood and "White Water"

Eighteen reasons why you should use "Michigan" combination steel and wood pipe

1—Durability of Wood Shell. 2—Sanitary. 3—20% more capacity than Cast Iron Pipe. 4—Simplicity in handling. 5—Light in weight. 6—Speed in laying. 7—Protects against freezing. 8—Not affected by Electrolysis. 9—Rigid inspection of materials. 10—Efficient construction of stave. 11—Strength of steel banding. 12—Protection of banding with asphalt coating. 13—Cannot burst under pressure. 14—Can be laid in a wet trench. 15—Short curves without specials. 16—Low installation and maintenance cost. 17—Responsibility of company. 18—Not affected by sulphur or chemical solutions.

THE MICHIGAN PIPE COMPANY

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New York City, N. Y. ..... 17 E. 42nd St.	Boston, Mass. ..... 93 Broad St.
Oklahoma City, Okla. ..... 14 N. Dewey St.	Cleveland, Ohio ..... 919 Ulmer Bldg.
Chicago, Ill ..... Leiter Bldg.	Chattanooga, Tenn. ..... 702 James Bldg.
Montreal, Que., Can. ..... 204 St. James St.	Philadelphia, Pa. ..... 318 Widener Bldg.

"Steel for Strength—Wood for Durability"

position of general manager of the Newton Falls Paper Company, Newton Falls, N. Y. This company's plant consists of a sulphite mill, a reclamation or de-inking plant, and a two machine mill with a capacity of one hundred thousand pounds of paper per day. Mr. Stewart is to supervise the paper mill and the de-inking plant, and will not be connected with the sulphite mill.

The Newton Falls Paper Company is owned by the McGraw-Hill Company, Inc., of New York, and the entire output of paper is consumed by this publishing house.

Stewart has been with the American Writing Paper Company since 1915. In the two years he has spent in the Miami Valley, he has made many friends, and is very popular. He is secretary of the Miami Valley Division of the Pulp & Paper Mill Superintendents' Association.

No announcement has been made as to his successor at the Harding Mill.

Paper Mill Men Make Changes

Peter G. Servaas, who served for many years as assistant to the general manager of the Riverview Coated Paper Co., at Kalamazoo, Mich., and since the absorption of this company by the Kalamazoo Paper Company, with that company, has severed his connection to again become associated with Felix Pagenstecher, who was formerly manager of the Riverview Paper Company, but is now president of the Bryant Paper Company.

Mr. Servaas will be the assistant to the president.

With this announcement comes the information that James H. Wright, sales manager of the Bryant Paper Company, has resigned from this position. Mr. Wright is well and favorably known in Kalamazoo, going there to take the position of assistant to the president of the Bryant Paper Company, where the late Frank H. Milham was in charge. He later filled the positions of purchasing agent and sales manager.

Mr. Wright has not decided upon what he will do in the future.

The announcement is also made that Phil G. Baltz had accepted a position with the Seaman Paper Company of Chicago.

Mr. Baltz first came to Kalamazoo as sales manager of the King Paper Company, a position he held for several years. He resigned to join forces with the late John F. King in the organization of the Rex Paper Company. He left that concern and accepted the management of the New York City sales office of the Ticonderoga Pulp and Paper Company, returning to Kalamazoo to again become allied with the King Paper Company.

John F. King

It is with great regret that we chronicle the passing of John F. King, one of the best known paper makers in this country.

The writer first met Mr. King in 1893, while he was superintendent of the Bardeen Paper Co., at Otsego, Mich. Among the other employees of the Bardeen mill at that time was Noah Bryant and his son-in-law, Frank H. Milham.

In 1895 these three men went to Kalamazoo at the urgent request of some local people and broke ground for the first unit of what was afterwards the Bryant Paper Co., now one of the largest paper making plants in America.

Later Mr. King severed this connection, and with others organized the King Paper Co., of Kalamazoo, and was made one of the officers and general superintendent. A few years ago, being desirous of building up a future business for his son, he left the King Paper Co., and organized the Rex Paper Co., of which he was president and the largest stockholder until the time of his death.

John F. King was a fine type of man, quiet, unassuming, with a wonderful knowledge of the art of making paper, and a man beloved by all those whose good fortune it was to know him.

Harry B. Prather

Harry B. Prather, of Cleveland, Ohio, particularly well known among the paper manufacturers of Michigan and Ohio, where he did considerable engineering work among the mills for many years, recently passed away at his home in Cleveland.

It is announced that the business of H. B. Prather & Co., of which he was the head for many years, will be continued as usual.

G. E. Buchanan, secretary-treasurer of the Appleton Wire Works, Appleton, Wis., has just returned from a vacation trip to Pasadena, Cal.

Rebuilt Paper Mill Machinery in Stock and Guaranteed

Not Where Is and As Is

FOURDRINIER TISSUE MACHINE—One 96", one 72".
FOURDRINIER PARTS—Pusey & Jones 118", 100". Kutter Trowbridge 96".
PRESS PARTS FOR PAPER MACHINES—Pusey & Jones Bell Crank housing, two sets 18"x96", Black & Clawson swing arm housings with rolls.
DRYERS—Four 48"x111", four 48"x68", one 84"x67", eleven 42"x66".
MARSHALL DRIVES—Three Black & Clawson self-contained stand with friction clutch cone pulley and 6" mortise gears. Mortise gears and pinions for Pusey & Jones Marshall drives 5" to 8" face.
CHILLED CALENDERS—One 66" face, five roll, one 54" face, five roll.
DILLON DOCTORS—For Machine Calenders 60" to 120" face.
SLITTERS and WINDERS—One 120" Warren, one 108", 36" Kidders.
REELS—Pusey & Jones two drum upright 48" to 114".
BEATERS—Six 72"x42" Noble & Wood, two 66"x42" Noble & Wood, equipped with three cylinder washers; one Dilts 62"x50" iron tub, one Jones 62"x32", seven Horne 36"x36".
JORDANS—One Wagg Majestic, three No. 2 Dillon Improved, one Large Horne, five Monarch, two Pope Brushing engines.
SCREENS—Three 12-plate open side Packer. Six 10 plate. Two six plate.
STUFF PUMPS—Deane, triplex 8"x12", Gould triplex 8"x10", Sandusky triplex 4"x6".
REVOLVING SHEET CUTTERS—One 104" Horne, one 50" Hamblet diagonal, one 42" Finlay, four 61" Hamblet, four 61" Finlay.
WET MACHINES—Four 72" Bagley & Sewall Hydraulic.

We have a large number of pumps and over five hundred calender, press and couch rolls in stock.

Frank H. Davis Company
175 Richdale Avenue, Cambridge, 40, Mass.

Hayton Centrifugal Pumps

SAVE POWER and MONEY
BY USING

HAYTON CENTRIFUGAL PUMPS

"With us it is an engineering problem"

Designed especially to meet the requirements of pulp and paper mills. We do not build a pump after OUR ideas and then try to sell it to you. We make a study of YOUR peculiar problems, and then build a pump to suit your needs. Hayton Pumps are built for hard, continuous operation, and will stand up under the most severe usage. We guarantee the highest efficiency, and maximum economy in power consumption.

We also build a full line of Sandusky Triplex pumps.

Let us have your specifications for quotations

Hayton Pump & Blower Co.
Manufacturers
APPLETON, WISCONSIN

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¶ Paper, Pulp and Fibre Mills, including Buildings and Complete Mechanical Equipment. ¶ Water Power Development. ¶ Dams, Storage Reservoirs and other Hydraulic Structures. ¶ Steam Plants

Examinations
Reports
Estimates of Cost
Designs
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Valuations

A New K. V. P. Mill

The Kalamazoo Vegetable Parchment Company, Kalamazoo, Mich., are making plans to begin work in the spring on a new two-machine mill, to be built near the Glendale division of this company.

The buildings will be one and two stories high, and will be about 1,000 feet long by 90 feet wide.

President Kindleberger announces that two 165-inch Fourdriniers will be installed. They will be built especially for the manufacture of special papers. One machine will have a speed of 1,000 feet a minute, the other is rated at about 600 feet a minute. When the new mill is completed, it will give employment to 250 hands increasing the total Kalamazoo Vegetable Parchment payroll to over 600 in number.

The production will be increased from 60 to 140 tons daily, thus ranking fourth in tonnage among the mills in the Kalamazoo valley district. Billingham & Cobb, architects and engineers of Kalamazoo, are now engaged in working out the plans and specifications.

The problem of financing the construction of this mill has been provided. Early in 1921, the Kalamazoo Vegetable Parchment Company increased its capital from $1,000,000 to $3,000,000, selling $1,150,000 stock on the partial payment. It was all subscribed and the first quarterly payment made. Owing to dull times, the original building plans were put off and further payments suspended until called for. Now that a building campaign is decided on, the call will be issued for stock payments.

Carthage Mill Expands

The Carthage Sulphite Pulp and Paper company, which recently through its president, James A. Outterson, purchased the property of the Champion Paper company of Carthage and took over the plant of the Ogdensburg Paper Mills, Inc., will install a new Fourdrinier paper machine of Bagley & Sewall construction and bring its daily production up to 150 tons, making it one of the largest paper producing corporations in this section of the state. The machine will be placed in the present plant of the Champion mill.

Besides this machine the company proposes to establish a bleaching plant with a capacity of from 50 to 60 tons of sulphite a day. A pipe line 1,900 feet in length between the sulphite plant and the Champion mill will be built and sulphite for the needs of the Champion mill will be transferred by gravity.

The breaking of a head-gate in the Biron Division of the Consolidated Water Power and Paper Co., Wisconsin Rapids, Wis., recently caused an inrush of a torrent of water and the death of two men. The men were members of a construction crew who were employed in making way for the installation of two new grinder sets. The paper mill was entirely shut down, as the water rushing in caused all motors to be stopped. No attempt was made to explain the cause of the accident, as the head-gate held up under similar conditions for several years.

Large quantities of spruce pulpwood have been arriving in the Fox River Valley during the last few weeks and have been attracting a great deal of attention. Years ago people were accustomed to seeing nothing else, but of late years it has been replaced to a large extent by hemlock logs. The spruce has the appearance of being freshly cut and comes from the Lake Superior region.

Arrangements were completed recently whereby agents for the Canadian merchant marine will ship large quantities of paper pulp from Ocean Falls, British Columbia, to Astoria, Oregon, for transhipment to Camas, Wash. This company will operate three steamers in the trade. The pulp is for the Crown Willamette Paper Company.

It is reported that Japan is offering an encouraging market for hempt at present. The country is importing about 20,000 bales a month from the Phillipines and sixty or seventy per cent of this has been purchased for manufacture into paper. About thirteen per cent of the mills in Japan are using Manila hemp and the paper is of good quality.

On account of low water the pulp mill at Gross, Mich., belonging to the Escanaba Paper Co., Escanaba, Mich., has been closed down for some time, but recent rains have changed the river conditions so that the mill has resumed operations again.

FOR IMMEDIATE SALE

Pulp Mill Equipment

3 Digesters, soft steel plate, welded joints, inside dimensions 8' dia. x 27' overall, test pressure 165 lbs., capacity, 1500 cu. ft. cradles, columns, false bottoms and heads included.
3 Morterud Liquor Heaters 44" dia. x 11' 6" high.
3 Centrifugal Pumps, 5" suction and discharge for liquor heater.
1 Centrifugal Pump, 3" suction and discharge.
2 Tanks, Liquor Measuring, steel ¼" plate sides, ⅜" bottom, inside dimensions 10' dia. x 12' high.
2 Tanks, Liquor Heating, steel ¼" plate sides, ⅜" bottom, inside dimensions 10' dia. x 12' high, coils of 3" extra heavy steel pipe, 12 windings, 8' dia. x 8" pitch.
1 Pump, centrifugal, horizontal, vertical discharge, 5" suction, 4" discharge for pumping liquor from heating tanks to digesters.
1 Pump, centrifugal, horizontal, vertical discharge, for pumping black liquor, 4" suction, 3" discharge.
1 Cyclone Separator Tank, ⅜" plate, 12' dia. x 9' high.
1 Condenser, ¼" plate, 6 ft. dia. x 14' high.
1 Tank for hot wash water, 3" wood, 12' dia. x. 12' high inside.
7 Diffusers, 1/16" plate sides, top and bottom of ½" plate, 10' dia. x 16' high inside.

Write, Wire, Telephone

Sales Department

CHARLESTON INDUSTRIAL CORPORATION

Nitro, W. Va.

FOR SALE CHEAP

Pumps

4 vertical, horizontal discharge, 3" discharge, 3" suction, 200 G. P. M. of sulphuric against a head of 30 ft. at 1150 R. P. M. belt driven, Pulley 10" dia. 4½" face. One bottom and one side inlet. Cast iron impeller and cast iron shaft connected to a steel shaft 1 7/16" dia. Norman Hubbard Sons.

10 vertical, special submerged, cast iron horizontal discharge 3", 3" suction, belt driven with 12" dia. 5" face cast iron pulley. Kurtztown Foundry & Machine Company.

25 Class "C," open impeller type, 5" suction, 4" vertical discharge, 700 G. P. M., 50 ft. head, 1025 R. P. M., belt driven 8" x 8" pulley. Worthington Pump & Machine Company.

15 horizontal, vertical discharge 4", 5" suction, belt driven, 10" x 8" pulley. Lawrence P. & E. Co.

10 four stage horizontal type, manufacturer's No. 6, 8" suction, 6" discharge, horizontal, 1000 G. P. M., 635' head, 1750 R. P. M., water cooled bearings. Mounted on base plates arranged for direct connection to motor or turbine. Allis Chalmers Mfg. Co.

12 single stage type EE, iron impeller, 8" suction, 6" vertical discharge, 1100 G. P. M., 85' head, 950 R. P. M., belt driven, 10" x 10" pulley. American Well Works.

Write, Wire, Telephone

Sales Department

CHARLESTON INDUSTRIAL CORPORATION

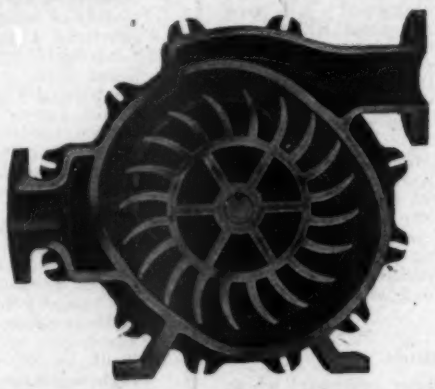
Nitro, W. Va.

THE HYTOR VACUUM PUMP FOR FLAT BOX SERVICE

Vacuum Produced Absolutely Without Pulsation

No Vibration

Saves Wires



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No Rods, Pistons, Crank Shafts, Loose Moving Parts, and No Gears

No Expert Attendance

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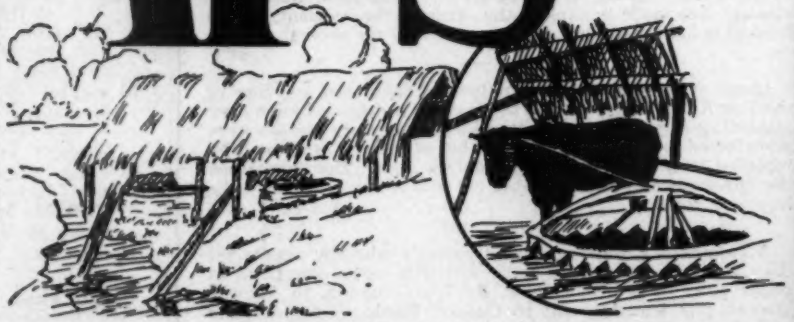
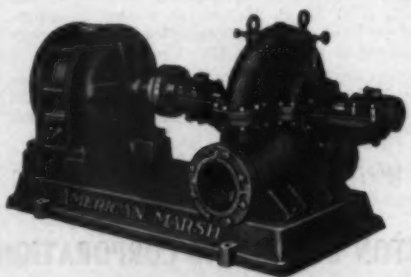
PUMPS

Chinese rice-fields are dotted with these curious "pumping stations."



BECAUSE his rice-fields were always calling for water, the Chinaman was forced to become something of an engineer. Not only did he invent a number of different pumps, but he also developed primitive "pumping stations," oxen and cog-wheels supplied the necessary power.



CENTRIFUGAL PUMP

Whenever—today—you run across difficult pumping problems, you will find American-Marsh Pumps on the job. Our Centrifugal Pumps (as is the case with all American-Marsh Pumps) are simple, reliable and efficient.

WRITE FOR BULLETINS

American Steam Pump Co.

BATTLE CREEK, MICH.

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1220 Monadnock Block

New York Office
17 Battery Place

The American-Marsh line includes Power Pumps, also Boiler Feed Pumps, Centrifugal Pumps, Air Compressors, Vacuum Pumps, Condensors, Deep Well Engines.

News Personals

Frederick H. Glover has been appointed manager of the specialties section of the American Writing Paper Company, succeeding Oliver Young, who recently resigned. Mr. Glover began his career in the paper industry in the Cincinnati office of the Whitaker Paper Company, where he was located for five years. In 1919 he was made assistant manager of the Whitaker Detroit branch, and a year later was transferred to the Chicago office, holding the position of general manager there until he resigned to join the American Writing Paper Company.

A new paper jobbing concern under the name of Ireland & Holmes, Inc., has been formed in New York City, with George H. Ireland as president, Norman Holmes as treasurer, and K. C. Newman as secretary. The firm has started in business with offices and warehouses at 119 West Fortieth street, and will handle news print, book and bond papers. Mr. Ireland recently disposed of his interests in the Ireland, Nelson Paper Company, of New York, in order to join forces with Mr. Holmes, who was formerly with the Union Alliance Corporation as manager of its import and export department.

The Valley Iron Works Company, of Appleton, Wis., builders of machinery for paper and pulp mills, has opened a New York office at 334 Fifth avenue, Room 203, with W. H. Burns, secretary and sales manager of the company, in charge. Mr. Burns has been with the Valley Iron Works Company for a quarter of a century and is widely known among paper and pulp manufacturers. Through its New York sales office the company hopes to provide quicker and more efficient service to its customers in the eastern part of the country.

E. G. Rippel, one of the organizers of the Buffalo Foundry & Machine Co., Buffalo, N. Y., and for many years in charge of the sales of this company, has resigned his position with this company. Mr. Rippel has been a great believer in trade journal advertising, and caused considerable comment several years ago by using nearly one hundred pages in one issue of a trade paper. He proved it was a profitable thing to do.

The Robertson Paper Company, manufacturer of waxed and oiled papers, bread wrappers, etc., with mill in Bellows Falls, Vt., has opened a New York office in the Canadian Pacific Building, 342 Madison avenue, with Joseph Poppe, selling agent for the company in the metropolitan territory, in charge. M. Goldberg is associated with Mr. Poppe in the new office.

Young Singleton Walter, vice president and treasurer of Clement & Stockwell, Inc., one of the oldest paper jobbing concerns in New York City, died at his home in Neponsit, Long Island, March 19 at the age of 41 years. Mr. Walter was a graduate from the University of Pennsylvania, and was widely known in the paper trade.

A. P. Blackstead, formerly chief engineer of the Camden Iron Works, Camden, N. J., and prior to that hydraulic engineer with the Henry R. Worthington Company, New York, has joined the engineering staff of the Dayton-Dowd Company, manufacturers of centrifugal pumps and approved underwriters' fire pumps.

H. E. Ramsen, formerly assistant manager of the Indianapolis branch of the Whitaker Paper Company, has taken charge as office manager of the Whitaker offices in the Crozer Building in Philadelphia. Mr. Ramsen will attend to all inside business, leaving the recently organized sales organization in Philadelphia to spend all the time in the field.

The Hudson Bag Company, Inc., has opened a suite of offices at 516 Fifth avenue, New York, to better accommodate the trade.

A Long Journey

C. J. Bastedo, sales manager for the Paraffine Companies, Inc., with paper mills at Los Angeles, Cal., has started on a 29,000-mile tour of the Orient, with the hope of expanding the company's trade in the countries visited.

His mission will require possibly eight months of travel and will take him to most of the company's long and regularly established offices throughout Japan, China, Straits Settlements, India, Burma, Ceylon, Dutch East Indies, French Indo-China, Australia and New Zealand.

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Mill Architects. Watertown, New York
CHEMICAL PULP MILL EQUIPMENT
Specialty
ACID SYSTEMS, DIGESTER AND ACID PROOF LININGS, GUARANTEED
Service Department Always Ready for Emergencies. Only High Class Experienced Men Employed

HALL, WARD AND WALKER, INC.
wish to announce a change of its corporate name, effective January 1, 1922, at which time the name of Wood Grinding Service, Inc. will be assumed.

Our personnel will be the same as under the old name and our business will in the future continue to be as in the past: The rendering of expert assistance in all matters pertaining to the grinding of wood pulp of superior quality and its conversion into paper with low percentages of sulphite.

Our Process and Appliances are protected by Letters Patent in the leading paper making countries of the world and we are now prepared to assign national rights or issue individual mill licenses in each of the following countries:

United States, Canada, New Foundland, Norway Sweden, Finland, Germany and Japan

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Felts & Jackets

We have for a long number of years furnished felts for some of the largest pulp, board, news and writing mills in the country.

Manufactured By

APPLETON WOOLEN MILLS

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Philip L. Amon, formerly manager of the paper department of W. R. Grace & Company, of New York, has joined the sales staff of Clement & Stockwell, Inc., paper merchants of 75 Beekman street, New York. Frank Points, formerly with Parsons & Whittemore, is another recent acquisition to the Clement & Stockwell selling force.

F. A. Karls, for the past four years superintendent of the Lincoln mill of the Eastern Mfg. Co., at Lincoln, Me., has resigned to accept a position with the Champion Coated Paper Co., Hamilton, O. G. W. Verron, who has been boss machine tender at the Eastern Mfg. Co's mill at South Brewer, has been promoted to succeed Mr. Karls.

Ernest M. Beers has severed his connection with Coy, Hunt & Company, paper jobbers of New York City, and has associated himself with the newly formed organization of Coy, Disbrow & Company, Inc., paper merchants of 309 Canal street, New York.

The numerous friends of Jacob Seibert, of Price & Pierce, Ltd., pulp importers and dealers of 17 East Forty-second street, New York, will be interested to learn that he has joined the "army of benedicts." Mr. Seibert was married on February 23.

James A. Donoghue, for the past 14 years with Coy, Hunt & Company, of New York, has severed his connection with that paper jobbing house to become affiliated with the new firm of Coy, Disbrow & Company, Inc., paper dealers of New York City.

Robert H. Spears, formerly representative in the New York district for the Whittemore Manufacturing Company, is now a member of the sales force of the Seaman Paper Company in the latter concern's New York office.

P. A. Harris, of St. Louis, has accepted a position as general manager of both the Aetna Paper Company, at Dayton, Ohio, and the Howard Paper Company, at Urbana, Ohio.

The Castanea Paper Company, with offices at 200 Fifth avenue, New York City, has filed notice of an increase in capitalization from $2,000,000 to $6,000,000.

The New York office of the George W. Wheelright Paper Company, now at 200 Fifth avenue, will be removed to Room 1321 at 320 Broadway on May 1.

George M. Rogers is now associated with R. F. Hammond, pulp dealer and mill agent of 342 Madison avenue, New York.

Z. W. Ranck, president of the Crystal Tissue Company, of Middletown, Ohio, is spending several months in California.

Diamond Power Specialty Corporation

The Diamond soot blower business has been purchased by new interests in the form of the Diamond Power Specialty Corporation of Detroit, Mich., a new company which has taken over the business and plant of the Diamond Power Specialty Co., Co-partnership, the members of which are retiring from the soot blower business in the Western Hemisphere.

Mr. Norman L. Snow, president and treasurer of the new company, resigns his position as vice president and active head of the Terry Steam Turbine Co., of Hartford, Conn., with whom he has been connected for the past thirteen years. Mr. Snow is a graduate of Yale Scientific School and Massachusetts Institute of Technology, and has been in the power plant field for the past eighteen years.

The Chain Belt Company, Milwaukee, Wisconsin, has announced the appointment of G. F. Sherratt as manager of the Pittsburgh Office in the Union Arcade Building. Mr. Sherratt will be in charge of all the company's chain and engineering business in the Pittsburgh territory and is equipped to render engineering service on power transmitting and material handling problems. Chain Belt Company specializes on chain and material handling equipment for all industries. The products of the company are manufactured under the trade-name of "Rex."

The Combustion Engineering Corporation, New York, announces the opening of a new branch office in the Guardian Bldg., Cleveland, Ohio, to be in charge of Frank Henderson.

J. O. ROSS ENGINEERING CORPORATION
CHICAGO 30 E. 42d St. NEW YORK CITY BOSTON
PAPER DRYING SYSTEMS
HEATING VENTILATING
"STURTEVANT"
VAPOR ABSORPTION SYSTEMS

STANDARD BLEACHING POWDER
Manufactured by
Pennsylvania Salt M'f'g Co.
PHILADELPHIA, PA.

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Calender
Beating
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For all grades of stock
PROMPT LABORATORY SERVICE
SANDOZ CHEMICAL WORKS
INCORPORATED
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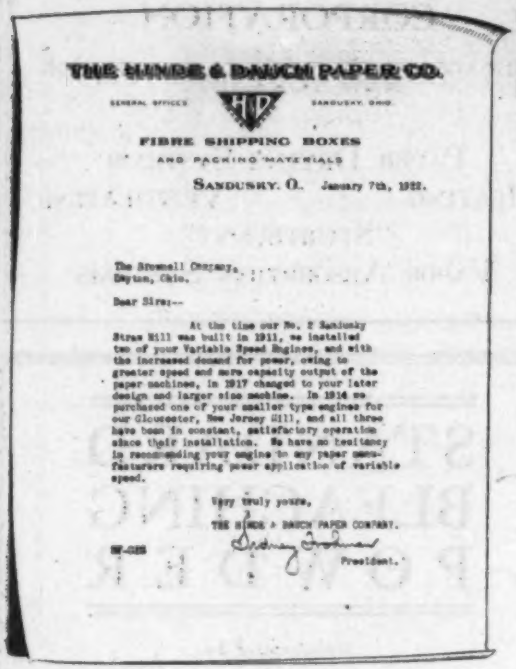

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GENERAL OFFICES SANDUSKY, OHIO

FIBRE SHIPPING BOXES
AND PACKING MATERIALS

SANDUSKY, O. January 7th, 1922.

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Dayton, Ohio.

Dear Sirs:--

At the time our No. 2 Sandusky Straw Mill was built in 1911, we installed two of your Variable Speed Engines, and with the increased demand for power, owing to greater speed and more capacity output of the paper machines, in 1917 changed to your later design and larger size machine. In 1916 we purchased one of your smaller type engines for our Gloucester, New Jersey Mill, and all three have been in constant, satisfactory operation since their installation. We have no hesitancy in recommending your engine to any paper manufacturers requiring power application of variable speed.

Very truly yours,

THE HINDE & DAUCH PAPER COMPANY.

By [signature]
President.

BROWNELL

The experience of The Hinde & Dauch Paper Company with three Brownell Variable Speed Engines is typical of many large paper making organizations.

Brownell is the pioneer in the development of variable speed engines for paper mills and has consistently led the way in improving these highly specialized machines.

There are a number of important and exclusive features in Brownell construction that you should be familiar with. If you are not, let us send you Bulletin E-4.

Sales Representatives in nearly all large cities

The Brownell Co., Dayton, Ohio
Established 1855

VARIABLE SPEED ENGINES

JAMES

SPEED REDUCING TRANSMISSION

The Universal Drive

A typical installation of a James Speed Reducing Transmission, direct connected to motor.

Send for literature describing our transmissions and their adaption in the paper industry.

MEMBER OF AGMA

D. O. JAMES MANUFACTURING COMPANY
1114 W. Monroe St. *Manufacturers of Cut Gears of Every Description* **CHICAGO, ILL.**

Swenson and Whiting Consolidate

A consolidation recently made in Chicago, will interest our readers involving as it does the Swenson Evaporator Company, long and well known as builders of special machinery for the reclaiming end of soda and sulphate mills. This company has been manufacturing its product in its own shops located in Eastern Indiana. They have been purchasing castings and steel plate construction parts from the Whiting Corporation at Harvey, Illinois, one of the country's largest builders of cranes, foundry equipment and railway apparatus.

The Whiting Corporation, an old and well established manufacturing company with offices in most of our large cities, are probably known to many of our pulp and paper mills as builders of electrical over-head traveling cranes, having capacities of from one to two hundred and fifty tons. They have a large and modern plant including brass, grey iron, semi-steel and steel foundries, complete machine shops, structural and plate steel shops, forge shops, pattern shop, etc. In these times of industrial concentration, the logical thing was to combine these two businesses and within the past month the Whiting Corporation has taken over the Swenson Evaporator Company including its sales and engineering personnel, all of its records, data, etc., and hereafter all Swenson products will be turned out at Harvey. The Swenson Evaporator Company will continue to be operated as a separate company, being a distinct department of the Whiting Corporation. All old customers and friends can be assured that these increased manufacturing facilities will result in better machinery and lower prices because of the elimination of certain overhead expenses which were previously duplicated.

Mr. F. M. deBeers, formerly President and General Manager of the Swenson Evaporator Company, and our old friend and well-known pulp engineer, Mr. P. B. Sadtler, Vice-President and Assistant General Manager of the Swenson Evaporator Company, will continue in charge of sales and engineering as General Manager and Assistant General Manager of the Swenson Evaporator division of the Whiting Corporation. Mr. T. S. Hammond, Secretary of the Whiting Corporation, is President of the Swenson Evaporator Company with other directors the same as those of the Whiting Corporation but with Mr. deBeers as Vice-President of the Swenson Evaporator Company and also a Vice-President of the Whiting Corporation. Sales and engineering offices will be maintained at the old Swenson office, 945 Monadnock Block, Chicago.

Because of the increased manufacturing facilities, the Swenson Evaporator Company are now in a position to offer a more complete line of reclaiming machinery and all old friends and new ones can be assured a continuation of the same personal service and high quality design that has made the Swenson name so well known in the pulp business.

The application of evaporators to the purification of boiler feed water by distillation is covered in a general and non-technical way in a new bulletin, No. 360, published by The Griscom-Russell Company, 90 West Street, New York. This booklet, which is just off the press, is so written that the application of Reilly Evaporators Self-scaling to the power plant for the elimination of scale, blow-down, priming, etc., can be readily understood by the non-technical executive as well as the engineer.

Members of the Boston Club of Printing House Craftsmen will tour through cities of the Middle West the latter part of March and the first part of April in the interest of the coming Graphic Arts Exposition and the Third Annual Convention of the International Association of Printing House Craftsmen, which will be held in Boston the week of August 28th to September 2nd, 1922. During the trip, they will confer with members of the International Board.

A delightful little book has just been issued by the Bird Machine Co., South Walpole, Mass., entitled "Critical Points in Pulp and Paper Making." While the text is made up mainly of matter descriptive of this company's machinery, it is gotten up in such a unique fashion that it should readily find a place in the office of every paper and pulp mill.

The Paul A. Sorg Paper Company, and the W. B. Oglesby Paper Company, both of Middletown, Ohio, have been operating to capacity since the first of the year, although they have acrimonious things to say about prices in general.

The Advance Bag Co., Middletown, Ohio, with paper mills in Maine, will soon start up a new bag factory at Holland, Me. C. T. Elliott has opened up Eastern headquarters for the company, with offices in Boston.

UNION SCREEN PLATE CO.
Fitchburg, Mass., U. S. A. Lennoxville, P. Q., Canada

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UNION BRONZE SCREEN PLATES
(Best phosphorized Cast Metal)

Old Plates RECLOSED and RECUT to accurate gauge
UNION BRONZE SCREWS for Screen Plates
Immediate Delivery of the Largest Orders. Satisfaction Guaranteed

The Witham Screen Plate Fastener, Patented
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SCREEN PLATES *and* **DANDY ROLLS**

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Originators and Oldest Manufacturers
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MANUFACTURERS OF
WARREN IMPROVED CALENDER DOCTORS
With Flexible Blades, Universal Adjustment and Control
(PATENTED)
WARREN IMPROVED PATENT DOUBLE DRUM WINDERS
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Stock Circulating Systems *and*
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SEND FOR OUR BULLETIN

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Products

Heavy Gearing and Friction Clutches for paper-mills, rubber-mills, tubemills, cement-mills, rolling-mills, stone quarries, and rock products, mining and coal-handling machinery, elevators and malt houses, turbines and water wheels, sugar refineries, packing houses, electric light plants, powder-mills, glass factories; cut gears and machine molded gears of all kinds.

Shafting, pulleys, hangers, couplings, collars, pillow blocks, worm-wheels, fly-wheels, and rope sheaves.

Makers of grey iron, and semisteel castings by analysis.

Special machinery built to order on modern tools at usual shop rates.

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Engineers, Founders, and Machinists

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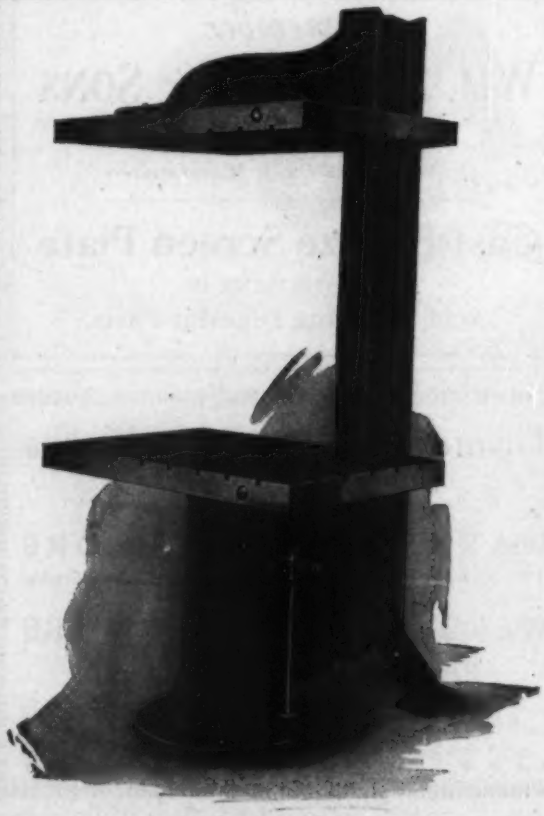
Emergency Orders Receive Special Attention



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An open type Pneumatic Bundling Press designed for putting up packages or bundles into bales, for shipment. Has 9 inch cylinder and can be made with 18x36 or 30x54 inch platens.

Will operate successfully at 90 or 100 pounds pressure.

This distance between platens is adjusted by lowering or raising upper platen.

Can be furnished for steam or water pressure at additional cost.

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Write for catalog, PAPER MACHINERY

HUDSON SHARP MACHINE CO.
Green Bay, Wis.

Gibbs-Brower Co., Selling Agents
261 Broadway, New York, N. Y.

New York, April 1, 1922.

ORDINARILY March is an active month for the paper industry. Usually preceding the pre-Easter season when consumption of many kinds of paper is heavy, and being about half-way between the beginning of the year and the summer with business generally brisk, March invariably finds paper mills working at a good rate of capacity, but the past month has been marked by conditions unsatisfactory to most members of the paper trade. It appears that what could be described as a reaction has developed, for, contrasted with the situation obtaining for paper during January, the last month has witnessed a change which in most respects has not been to the liking of paper manufacturers and dealers.

It is rather difficult to account for the slowing up of demand for most kinds of paper recently. Coming at just the period of the year when nearly everyone looked for marked improvement, and on top of what seemed to be a lasting revival of demand for paper, the position of the market in March has certainly been puzzling. There are those who are wont to attribute the unexpected condition to the continued cautiousness of the general public in purchasing the various articles of merchandise which it requires; others take the view that the unfavorable financial condition is the direct cause of the slump in demand for paper because the general tightness of money has kept consumers from laying in stocks; while others express the opinion that the quieter position of the paper market is nothing else than a natural slowing down of activity following the period of fairly good business during the first month of the year.

Whatever the cause, there is no denying that the paper industry has been considerably less active during the last few weeks than in the similar period immediately preceding. Reports from manufacturing centres generally tell of mills experiencing a narrower demand for their product, jobbers with few exceptions say that they are moving smaller supplies of paper, while large consumers mostly assert that they have let-up in their buying of paper to quite an extent. The most encouraging feature of the situation is that few or no authorities expect prevailing conditions to last. There remains a very confident and optimistic feeling in the trade, and nearly everyone professes to see a much better market condition immediately ahead. Most members of the trade—manufacturers and jobbers—are satisfied to explain the situation in March as nothing else than one of those periodical slowing down of activity in business which cannot bear explanation and which do not last for long.

Proof is not wanting, that, as the days go by, the paper industry is gradually working into a stronger technical position. Fundamentally, the market condition is improved over what it was a month ago, and by far stronger and healthier than during the dark days of 1921. This applies not alone to the paper industry, but to all the basic industries of the country, which means, of course, that the time is not far away when manufacturers and merchants will experience conditions of a more normal character, with most of the difficulties which they have been forced to contend with for the past year or longer eliminated.

Trade activity in paper at present is nothing more than of medium scope. There is a fairly consistent demand for most kinds of paper, yet there is nowhere near sufficient buying being engaged in by consumers to give every mill all the work which it has facilities for doing. The obvious result is that business competition is quite keen, so much so that prices cannot reach full stabilization and the entire market situation is being influenced in a more or less desultory manner. This in itself prompts consumers of paper to be cautious in their buying, while conditions obtaining in the various paper consuming industries cause buyers to be wary in laying in stocks and in proceeding in absorbing supplies in the customary way.

A consensus of opinion of prominent paper dealers and producers is that complete normalcy will not be attained in the industry before the fall of the present year. It is commonly felt that business will show some pick-up during the next month or two but that the inevitable summer slump will develop this year as it usually does, and that truly favorable conditions will not be experienced before fall. Regarding the fall season, a highly optimistic note is sounded on all sides. Many are of the belief that the early autumn will witness an appreciable return of demand for paper of all kinds, as it is expected that with stocks in consuming and jobbing establishments at a low level, buyers will make an appearance in force soon after the summer to replenish their supplies and with a view of "getting the jump" on the other fellow. In the meantime, it is felt that there will be an inclination toward business improvement. A majority anticipate much better business in April; in fact, there are numerous indications now visible that demand for paper will broaden materially during the next month. One of the best of these indications is the situation lately developed in box board. Paper box manufacturers all over the country have placed numerous orders during the last few days for board to be delivered in April, as a result of which most board mills are reported to be booked up almost entirely for the month, with some having contracted for the disposal of every ton of board which they can produce not alone in April but during a part of the following month.

The newsprint trade is seemingly the one exception to the slowing down of the paper market during the past few weeks. News print is moving to publishers in comparatively large tonnage, possibly not quite as large as earlier in the year but nevertheless in sufficient amounts to compare very favorably with statistics of previous years. Moreover, prices on print paper are steady, which would appear to substantiate the contention that price stabilization attracts demand. The contract basis is well maintained at 3.50 cents per pound at mills for standard news in rolls, and quotations to transient buyers are holding at 3.50 to 3.75 cents. Consumption of news print is comparatively heavy and there has been an increase within the last several weeks as retail merchants have been using more advertising space in trying to stimulate pre-Easter buying.

Business in book papers is principally of the small-lot variety and mills are actively competing for orders, yet quotations are steady and in some cases exhibit a stiffening tendency. Wrappings and tissues are in somewhat better demand at present than they were a short while ago, this improvement also doubtless being due to the Pre-Easter season. Fine papers are moving slowly; that is, orders are numerous enough but they lack volume. Boards are apparently on the threshold of an active period. Mills are well supplied with orders and are increasing their output to take care of the demand. It is true that most of the business booked is at rather low prices, filled news board selling at $37.50 to $40 a ton f. o. b., consuming points and plain chip board at $35 to $37.50, but activity is what counts these days and what must arise before price betterment can be expected.

Scotch Producers Combine to Push Esparto Paper

An important combine recently organized in the Scottish paper-making industry is reported in the March 6 issue of *Commerce Reports*. The new organization is to be made up of the esparto paper mills of Scotland, including eight or ten mills. There is no intention to disturb the existing organizations, the mills to continue their own individuality and their own directing board. The propaganda and the advancing of the business throughout the world generally will be handled by the board, with the assistance of the present distributing houses, which are for the most part favorably disposed. It is hoped to develop a very big business in America.

The sole idea underlying the action of the promoters of the new combine is to extend the demand for the use of esparto paper so as to enable it to be more cheaply produced. Esparto grass, which is gathered in large quantities in Africa and to a smaller extent in Spain, is said to constitute one of the best of paper-making materials, especially for those qualities of paper used in printing papers, books and magazines, as well as the qualities used in lithographic printing and art work. It is claimed that its great peculiarity is that it will not stretch, is opaque, and light in weight. It is also stated that the only place in the world where this class of paper is made is in the British Isles, chiefly in Scotland.

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Agents for Kellner Partington Paper Pulp Co., Ltd., Sarpsborg, Norway; Forshaga, and Edsvalla, Sweden.

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EASTERN AGENTS FOR PULP FOR
Port Huron, Mich., Mitscherlich Sulphite
Made by Port Huron Sulphite & Paper Co., Port Huron, Mich.

Papermaking Rags

The papermaking rag market is in a quiet position. Few consumers are actively in view as buyers and business is of far less volume than usually at this time of the year, the slow demand, of course, reflecting the limited operations of paper mills and the reluctance of consumers to absorb other than supplies actually and directly required. There have been several spasmodic spurts of buying certain grades during the last few weeks, but even taking these into consideration, the movement of rags toward paper mills does not commence to approximate that of more normal periods.

As respects supplies, indications are there are plentiful stocks or rags available throughout the country to fill mills' present needs. Moreover, from all accounts there are sizable amounts of rags held in the various European countries awaiting shipment to the United States. Further, with the spring here it is probable that domestic collections will increase, thus making for larger available supplies of rags. Evidently the matter of supply has little or no influence on consumers' operations as buyers, however; buying is confined today solely to cover immediate wants because paper manufacturers apparently believe that under the circumstances this is the wisest policy to follow. It is generally conceded that many grades of rags are about as low in price as they are likely to go, and consumers in frequent cases acknowledge that it would doubtless pay them to lay in stocks at this time, but the average paper mill is pursuing such a cautious course that it is next to impossible to induce it to take in raw material for which it has no direct use.

Despite the narrow demand, the market is surprisingly free of selling pressure. There are dealers, of course, who are anxious to find an outlet for rags, especially since some desire to make room in their establishments for expected spring collections, yet no one seems willing to sacrifice present stocks or to "take chances" on the future of the market. Dealers and packers themselves are careful in booking orders and show a decided aversion to entering commitments covering forward deliveries at ruling prices, thus reflecting the common belief in the trade that rags are due for a better market and higher prices. It is generally felt that the tremendous amount of building all over the country can only serve to make for a heavy consumption of all kinds of building paper, and that felt paper mills will soon be busily engaged in manufacturing paper for this purpose, thereby bringing them into the market for large amounts of rags. Also, it is contended that the low prices that have obtained on rags for some time past have kept foreign supplies out of the American market, which is considered a bullish factor and one likely to contribute to a rise in values when demand from consuming sources expands.

As the market is now constituted, prices are mainly nominal. It is difficult to say just how low purchases can be made in some instances, and the tone is so easy that almost every day witnesses further decline in prices on certain grades. Roofing stock has sold in the East to mills at 90 cents a hundred pounds for No. 1 packing and 80 cents for No. 2, f. o. b. dealers' shipping points. Old whites have slid off a half a cent per pound, and old blues exhibit a downward trend. No. 1 white shirt cuttings have been in fair demand, and most dealers ask 10 cents a pound or higher at shipping points for these rags. On the other hand, most of the remaining grades of new cuttings are on lower price levels.

Average quotations f. o. b. shipping points are:

New Stock—	New York and Chicago
White shirt cuttings, No. 1	10.00-10.25
White shirt cuttings, No. 2	5.25- 5.75
Fancy shirt cuttings	4.75- 5.00
Washables, No. 1	3.25- 3.50
Unbleached muslins	8.50- 8.75
White lawns	8.25- 8.50
Overall cuttings, blue	5.25- 5.50
Black silesias	3.00- 3.25
Old Stock—	
Whites, No. 1 repacked	4.75- 5.00
Whites, No. 2 repacked	3.00- 3.25
Whites, house soiled	1.50- 1.75
Whites, street soiled	1.25- 1.50
Lace Curtains	4.00- 4.25
Thirds and blues, rough	1.20- 1.40
Thirds and blues, repacked	1.75- 2.00
Black stockings	2.00- 2.25
Cotton canvas, No. 1	3.50- 3.75
White cotton batting	2.00- 2.25
Roofing, No. 1	.90- 1.00
Roofing, No. 2	.80- .90

Rope and Bagging

In comparison with other kinds of papermaking material, old rope and bagging are enjoying a fairly good demand. Buyers are operating conservatively; that is, few or none of them are absorbing supplies other than what they actually require for direct consumption, yet the movement of rope and bagging can be called moderate. The recent slump in prices on old rope has slowed up, importations from Europe of this commodity and dealers in the domestic product therefore are experiencing less trouble in finding an outlet for their rope, while the efforts of roofing paper mills to turn out felt paper with as low-priced raw material as possible makes for a fair consumption of scrap bagging.

Old manila rope in No. 1 condition and of domestic origin is bringing about 4.25 cents per pound at shipping points, with a shade better than this price paid in some cases. Old mixed strings are selling at an average of 90 cents a hundred pounds, and are meeting with a relatively good demand. Old No. 1 scrap bagging is quoted by dealers at an average of 95 cents per hundred pounds, roofing bagging at 75 cents, and No. 1 scrap gunny at from $1 a hundred pounds upward.

F. o. b. shipping point quotations follow:

	New York and Chicago
Gunny, No. 1 domestic	1.00-1.15
Gunny, No. 1 foreign	.90-1.10
Scrap bagging, No. 1	.90-1.00
Roofing bagging	.70- .80
Wool tares, heavy	1.40-1.60
Wool tares, light	1.20-1.40
Manila rope, No. 1 foreign	4.00-4.25
Manila rope, No. 1 domestic	4.25-4.50
Sisal strings	1.60-1.80
Mixed strings	.85- .95

Old Papers

The market for old paper could be a great deal livelier; on the other hand there is a fairly steady movement of a majority of grades, and summing up the situation as a whole, it can be stated that the market is characterized by medium activity. Board manufacturers, who are the leading consumers of waste paper, are buying in a more or less hand-to-mouth fashion, placing orders today for what they require tomorrow, and other buyers are following very much the same policy; nevertheless there is sufficient demand to sustain prices in most cases. Then, too, the factor of a short supply aids in maintaining values. It is said that the amount of old paper obtained from publishing houses, printers, office buildings, department stores and other large sources of supply is today nowhere near what it ordinarily is for the reason that these users of new paper are at present operating on a reduced scale and are conserving paper as much as they can. Packers, therefore, haven't the tonnage of waste paper to dispose of that they usually have, and consequently are not called on to exert pressure on mill customers to absorb accumulations as often as they would be if supply conditions were different.

The general trend of prices on old paper is downward. The market has lost its strong tone that existed a month ago when consumers were buying in much better volume than they are at present, and when it appeared that not enough of certain grades was available to go around, yet the decline that has occurred has been of slight dimensions. Furthermore, there are visible signs of the tone beginning to strengthen

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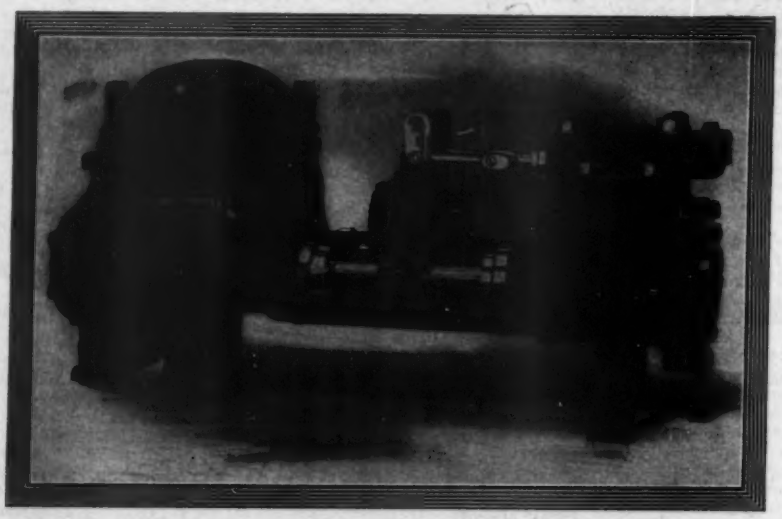
LONG DISTANCE TELEPHONE RANDOLPH 2233 **J. F. DAVIS** 1122-1123-1124 HARRIS TRUST BUILDING CHICAGO, ILL.

FAIRBANKS-MORSE PUMPS



Use this Proven Pump for Boiler Feeding and General Service

This duplex piston pattern steam pump is suitable for boiler feeding and similar service where pressure does not exceed 150 pounds.

Fairbanks-Morse pumps have proven their dependability and economy in every industry under the most severe conditions.

Our competent engineers, equipped by long experience and practical knowledge, will gladly help you work out your pumping problems.

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WYCKOFF WOOD PIPE

* PRESSURE PIPE THAT NEVER BURSTS.
Built in sizes 1 inch to 48 inches.

The Paper Industry is successfully using thousands of feet of this Pipe and they find it to be the best conveyance for Paper Stock and Acids that can be obtained.

The Pipe of Service

DURABLE—ECONOMICAL—EASY TO INSTALL

Built of selected Canadian White Pine, Wyckoff Wood Pipe is wound with steel bands whose tensile strength is 58,000 to 65,000 lbs. per square inch. The experienced engineer selects a pipe of proven dependability. Wyckoff Wood Pipe, during the past 65 years, has built a reputation that stands the keenest competition. It has been, during this time, the choice of the largest pipe users in the world. We also manufacture a high grade underground steam pipe casing.

Write today for catalog and prices

A. Wyckoff & Son Company
1855 Elmira, N. Y., U. S. A. 1920

again, this being due to reports of increased activity in the box board industry and indications that board producers will soon be in the market for larger amounts of waste paper. There seems little question but that any broadening of demand for old paper will almost immediately result in sending prices at least slightly higher because the market has sagged just enough during the last few weeks to place prices on a level where any improvement in demand would serve to enhance values.

Probably the most actively wanted grade at the moment is No. 1 mixed paper, which is selling to board mills at a price range of 45 to 55 cents a hundred pounds at shipping points, the lower figures prevailing mostly in the East. Old book stock holds fairly steady in price at between 1.35 and 1.50 cents for No. 1 heavy books and magazines, and old No. 1 kraft paper has changed but slightly to a quotable range of 1.80 to 2 cents per pound. Kraft is an apt example of how scarcity of material can hold up prices in the face of a slow demand. Few consumers are purchasing old kraft paper except in small lots, yet the shortage of this grade of waste paper is keeping prices quite steady.

There has been a little revision downward in quotations on shavings, No. 1 hard white shavings being quoted at 3.75 to 4 cents a pound at dealers' points, and No. 1 soft white shavings at 3.10 to 3.25 cents. Old newspapers are moving in comparatively light amounts at between 55 and 65 cents a hundred pounds for flat folded news.

Quotations f. o. b. shipping points are as follows:

	New York and Chicago
Hard white shavings, No. 1	3.75 -4.00
Hard white shavings, Nos. 2-3	2.75 -3.25
Soft white shavings	3.10 -3.25
Colored shavings	1.25 -1.50
Heavy book, No. 1	1.35 -1.50
Crumpled book, No. 1	1.05 -1.15
Ledger stock	1.60 -1.80
Kraft No. 1	1.80 -2.00
Manilas, No. 1	.90 -1.00
White blank news	1.65 -1.75
Overissue news, No. 1	.80 - .90
Folded news	.55 - .65
Mill wrappers	.70 - .80
Box board cuttings	.55 - .65
Mixed paper, No. 1	.45 - .55
Common paper	.30 - .40

Chemical Pulp

Domestic wood pulp is in a quiet position, and the market for this commodity seems waiting on the outcome of several developments in the foreign pulp trade which are commented on in another column of this issue of THE PAPER INDUSTRY. Should an import duty be imposed on foreign chemical pulp, which appears probable at this writing, there is no question but that domestic pulp producers would benefit by having a broader outlet provided for their product; also, should it be proven that the Canadians are dumping pulp into the United States and the U. S. Government should slap a tax on some of the shipments of pulp coming into this country from the Dominion, there is no doubt that a better demand would ensue for domestic sulphite and other kinds of wood pulp. At present, however, domestic pulp is finding a narrow outlet. Manufacturers in frequent cases complain of not being able to compete with foreign producers, and assert that it is more profitable for them to curtail their output than to market pulp at the prices at which imported pulp is being sold to paper mills. There is, of course, a moderate business transpiring on contract with those consumers who cover up their expected requirements for sometime ahead through the medium of long-term orders, but transient trade is on a small scale. Bleached sulphite is moving in light tonnage, and domestic mills making this kind of pulp are reported running at only about half capacity. The foremost producers quote 5 to 5.25 cents per pound at pulp mills for No. 1 bleached sulphite, but consumers in most instances are buying foreign sulphite which is available at 4.50 cents and less. News grade sulphite is in moderate demand at prices ranging around 2.50 cents a pound, and there is some call for No. 1 unbleached sulphite at between 2.75 and 3 cents a pound. Kraft pulp is easy at 2.75 to 3 cents, and bleached soda pulp shows a sagging tendency at 3.75 to 4 cents per pound.

F. o. b. pulp mill quotations follow:

Bleached sulphite	5.00-5.25
Easy bleaching sulphite	3.00-3.25
Unbleached sulphite, No. 1	2.75-3.00
News grade sulphite	2.40-2.65

A complete line of
Aniline Dyes
for the paper trade
Manufactured by
Consolidated Color & Chemical Co
Newark, N. J.
Central Dyestuff & Chemical Co
Newark, N. J.
H.A. METZ & CO Inc
One Twenty-Two Hudson Street New York City

WHITAR
TRADE MARK REG. U.S. PAT. OFF.
News Blue
Auramine

We Supply a Complete Line of

Aniline *and* Pigment Colors

for Paper Makers

SPECIAL SHADES OF COLORED PAPER OR SAMPLES OF DYESTUFF MATCHED AND COMPLETE FORMULAS FURNISHED

The White Tar Aniline Corporation
56 Vesey Street, New York City
Works: Kearny, New Jersey

FOURDRINIER WIRES

Dandy Rolls *Cylinder Molds*

Brass, Copper and Iron Cloth

Bank and Office Railings

WIRE SIGNS

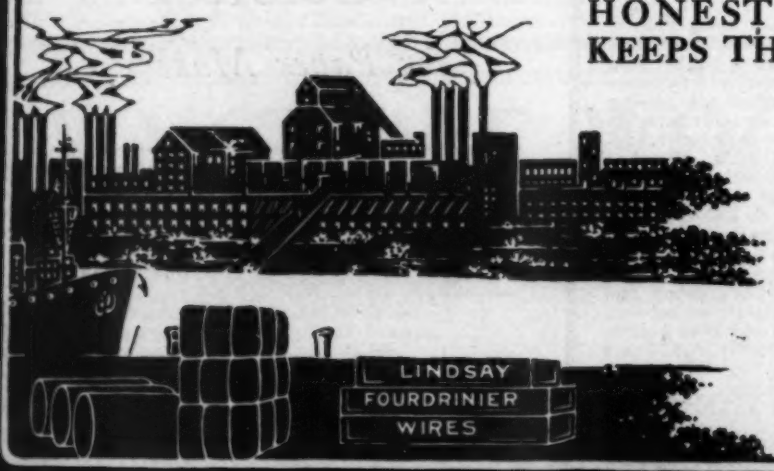
Cheney Bigelow Wire Works

Established 1842 SPRINGFIELD, MASS.

Real Merit Placed

Lindsay Fourdrinier Wires

In Many Mills



HONEST SERVICE KEEPS THEM THERE

They are ready to serve you

The Lindsay Wire Weaving Company

Collinwood Sta., Cleveland, Ohio

"Ask any Papermaker"

Soda pulp, bleached	3.75-4.00
Mitscherlich, unbleached	3.25-3.50
Kraft, No. 1	2.75-3.00
Screenings, refined	.80-1.00

Mechanical Pulp

Mechanical wood pulp is characterized by a fairly good demand. The movement into consuming channels does not begin to equal that of busier periods, but news print mills are frequently making an appearance in the transient market as buyers, and there is a comparatively good call for supplies from box board manufacturers and other consumers. Moreover, quotations are well maintained. The probabilities are that transactions are being negotiated in some cases at concessions, but on the other hand sales have been recorded recently at slightly higher prices than previously obtained, thus indicating that the market tone is far from weak.

Pulp dealers in New York who are bringing down ground wood from Canada—more often from the Nova Scotia district of the Dominion—in schooners and distributing pulp from that port report sales at $35 per ton f. o. b. New York, which is several dollars a ton higher than the prices lately ruling. It is understood that considerable business has been done in this connection recently and that paper and board mills in the East within a moderate radius of New York are procuring a good part of their supplies from this source at cheaper prices than if the pulp was transported from Canada by rail. Domestic producers quote from $30 to $34 a ton f. o. b. grinding plants, or at a delivered consuming mill basis of between $40 and $42 for freshly ground spruce ground wood for prompt shipment. Mechanical pulp can be bought in Canada down to $27 a ton f. o. b. producing mills but the high freights involved bring the cost to users up to about the same levels quoted on domestic pulp.

Chemicals

Current business in papermaking chemicals chiefly involves small lots. Consumers are keeping out of sight as buyers excepting when in immediate need of supplies and can hardly be prevailed upon to place orders unless requirements are pressing. Quotations rule fairly steady, with only slight fluctuations reported. Casein displays a firming tendency, and most quotations range around 9.50 cents a pound, while domestic producers in some cases quote beyond this level. Bleaching powder of domestic origin is selling at around 2 cents a pound and the foreign product at 1.80 to 1.90 cents. Caustic soda is steady at 3.50 cents per pound, as is soda ash at 1.75 to 2 cents.

Quotations are as follows:

Alum, lump ammonia	3.65- 3.75
Alum, lump starch	4.00- 4.25
Blanc fixe, powdered	3.50- 3.75
Bleaching powder	1.80- 2.00
Brimstone (long ton, at mine)	16.00-17.50
Casein	9.00-10.00
Caustic soda, spot delivery	3.50- 3.75
China clay, domestic washed	8.00-10.00
China clay, foreign	13.00-18.00
Rosin, grade E	5.35-
Satin white	2.00- 2.25
Soda ash, 58 per cent light (bags)	1.75- 2.00
Sulphite of alumina, commercial grade	1.40- 1.60
Starch, papermakers', in bags	2.20- 2.30
Talc (ton)	10.00-12.00

Market Prices for Machine Wires

The Armstrong Bureau of Related Industries for its clients, the manufacturers of paper machine wires, furnishes for publication the following prevailing market price information on brass Fourdrinier wires (new standard) as last quoted to the trade by the respective sellers and cleared through the Bureau:

	Price per sq. ft.
No. 60 mesh	50c- 51c
No. 65 mesh	52c- 53c
No. 70 mesh	56c- 57c
No. 75 mesh	61c- 62c
No. 80 mesh	61c-

Combustion Engineering Corp., New York City announce the opening of a new branch office at 1137 Guardian Building, Cleveland, Ohio. This office will be in charge of Mr. Frank Henderson, who has been associated with several of the most prominent stoker companies in this territory for many years.

BACK TO NORMALCY

Owing to substantial reductions in the cost of all materials entering into the construction of Jenssen Acid Towers, we are now building them at

NORMAL PRICES

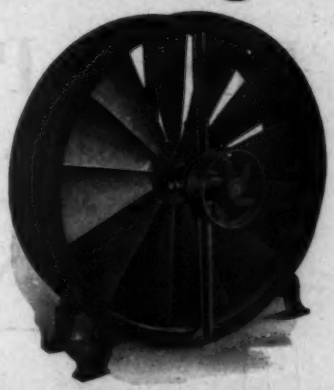
Will YOU let us show YOU how to make MONEY by making a

BETTER ACID

Don't forget that every second sulphite mill on this continent is using our towers, so ask your neighbor what HE thinks of them.

G. D. JENSSEN CO.
200 5TH AVE. NEW YORK, N. Y.

Ventilating Fans



The Knowlton Multiblade Fans are the best that can be obtained for paper mill ventilating because they are exceedingly rugged—perfectly balanced and the air capacity is exceptionally large.

Sizes in Stock 32 inch, 40 inch, 48 inch
Any other size built to order
Either Belt or direct connected Motor Drive

WRITE FOR CIRCULAR

May we have your inquiries for Special Machinery —Iron Castings—Table and Wire Rolls—Cut Gears —etc., etc.

KNOWLTON MACHINE CO.
Established 1864
WESTBROOK MAINE

ESLEECK'S THIN PAPERS

SINCE 1900 we have devoted our attention and our facilities to ONION SKIN, MANIFOLD, and THIN BOND PAPERS. These papers are made of clean rag stock (new cuttings from garment factories), and every department of our mill is operated on the quality basis.

The word "best" is used too freely, but it seems proper for us to mention the fact that many paper merchants, printers, stationers, and consumers acknowledge "Esleeck's" to be the standard lightweight papers. Our steadfast aim is to keep up the quality.

Fidelity Onion Skin, Emco Onion Skin, Superior Manifold and Recorder Bond Are Watermarked

ESLEECK MFG. CO. TURNERS FALLS, MASS.

THE SUMMIT OF QUALITY
ESLEECK'S THIN PAPERS
ESLEECK MFG. COMPANY

ALFRED LEEDS, President
KARL BECKER, Vice President

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350 Madison Avenue, New York, N. Y.

317 Main Street, Springfield, Mass., Branch Office for New England States

DEALERS IN ALL GRADES OF PAPER

Specialists in

Kraft Paper, Unglazed and M. G. Finish
Book Paper
Glassine, Plain and Embossed

Exclusive Distributors for

WESTFIELD RIVER PAPER COMPANY, RUSSELL, MASSACHUSETTS

New Papers

Writing—	
White rag	15-40
White sulphite, No. 1	10-20
Colored	12-40
Ledger—	
White rag	15-50
White sulphite	12-25
Colored sulphite	10-00
Colored rag	10-00
Bonds—	
White rag	13-40
White sulphite	9-20
Colored sulphite	10-25
Colored rag	14-40
Book—	
No. 1 S. & S. C.	6.50- 7.00
Machine finished	5.75- 6.50
English finished	6.00- 6.75
Coated and enameled	8.25-10.00
Lithograph, M. F.	9.50-12.00
Newsprint	
Rolls, contract	3.50-
Rolls, transient	3.50-3.75
Sheets	4.00-4.25
Side runs	3.00-3.25
Cover Stock—	
Coated, both sides	9.25-
Coated, one side	9.20-
Tissue—	
No. 1 white, 20x30	.90-1.00
No. 2 white, 24x36	.80- .90
No. 1 manila, 24x36	.80- .90
Kraft	1.00-1.25
Wrappings—	
No. 1 kraft	6.75-7.50
No. 2 kraft	5.75-6.50
Boards—	New York and Chicago
Solid news	40.00-45.00
Straw	45.00-50.00
Plain chip	35.00-40.00
White coated chip	60.00-70.00
Manila coated chip	55.00-60.00
Binders' board	70.00-80.00

Convention National Association of Purchasing Agents

The largest aggregate purchasing power in the world is said to be that of the membership comprising the National Association of Purchasing Agents, representing the leading industrial plants of the United States.

The Purchasing Agents will assemble this year for their seventh annual convention and exhibition at Rochester, N. Y., May 15 to 20. This will be in some respects the most valuable opportunity ever offered for exhibition of products by manufacturers, particularly in the lines to be covered by group meetings and exhibitions, as mentioned below.

The entire group of buildings of Rochester's famous "Exposition Park" has been engaged for the convention, in order to house a representative exhibition of products, for which hundreds of leading concerns have already engaged space. For example, the Eagle-Picher Lead Co. has arranged to have an immense booth showing a complete plant in miniature, engaged in manufacturing Sublimed White Lead. It is also expected that one of the leading makers of writing paper will have a paper-making plant in operation with a completely equipped laboratory as an educational feature.

This is the first time in the history of the association that the Purchasing Agents have invited the "selling agents" to meet them on common ground at an exhibition in connection with their convention. The occasion promises to be unique, as here the manufacturer and his salesmen may display and demonstrate their products to the largest buyers in the country, away from the "bomb-proof" security of their private offices and in an utterly different mood. In other words, at Rochester, May 15 to 20, the P. A.'s will meet the salesmen on the latter's "home grounds," instead of vice versa. The chance to "educate" the buyers in the exclusive features of new and staple goods is certainly one not to be overlooked.

Besides the speakers of National reputation who will address the convention on such subjects as "Commercial Bribery," "Arbitration," "Standardization of Coal Contracts," "State and Municipal Purchasing Methods," etc., the group meetings and technical demonstrations will cover many subjects such as Iron and Steel; Cotton; Lumber; Wool; Paper, etc. These group discussions will be led by experts in the various lines.

From advance hotel reservations, more than two months ahead of the convention, it is estimated that there will be in attendance at least 1,200 active purchasing agents from all over the United States and Canada.

H. M. Hanks, of Madison, Wis., and Geo. W. Kibby, of Chicago, were recently elected directors of the Nekoosa-Edwards Paper Co., Port Edwards, Wis.

Ninth National Foreign Trade Convention

Importance of the Ninth National Foreign Trade Convention, which will be held in Philadelphia, May 10th, 11th and 12th, to the industries of America in general and to the paper and printing industries and their workers in particular, are pointed out by Harrison C. Lewis, general manager of the National Paper and Type Company, of New York City.

Mr. Lewis, in announcing that he is planning to attend the convention, says in part:

"A large portion of the world is under-supplied with merchandise and a considerable portion ill provided with food. In consequence, unemployment exists, particularly in the countries which have deflated their currency and to an extent, their debts. While this is now unfortunate for us, it means that eventually we shall be more solidly intrenched in business than most countries not properly taxed and which have continued to inflate."

Among his reasons for an insufficient demand for American goods abroad, Mr. Lewis cites:

"The low prices made by at least one great nation whose government is running at a huge deficit, where wages are insufficient and taxes inadequate. This policy of low taxation and inadequate wages, which is basically false, has enabled her factories generally to undersell the rest of the world.

"The end of this uneconomic policy is now coming. Taxation is gradually being increased, though it still is insufficient, government deficits cannot be continued indefinitely, salaries are being slowly advanced, and the time is not far distant when the products of the United States will be in greater demand abroad than at any previous time.

"This increase in trade will be permanent because the United States does not turn back on any sound policy it undertakes. We have the productive capacity and the capital to put our goods in practically any market not barred to us by tariffs.

"The work of the Ninth National Foreign Trade Convention is, therefore, exceedingly important because it will be held at a time when the gradual and permanent improvement of our foreign trade—which means use of capital, the larger employment of labor and steady productive capacity of our shops—will be apparent."

Paper Secretaries Too Busy to Attend Hoover Conference

The paper industry was not represented in the trade association conference with Secretary Hoover, scheduled for April 12. Nearly every association in the paper industry held its annual meeting in New York City during the week, and several on the day set for the Washington conference.

Dr. Hugh P. Baker, secretary of the American Paper and Pulp Association, wired Secretary Hoover, telling him that while the paper industry is anxious to participate in the proposed conference, the fact that it comes during "Paper Week" will make it impossible for any of the secretaries to attend.

TRADE JENKINS MARK
Jenkins Bros

Economy That Endures

Consider the cost of a valve by the service it gives, for it is the valve that gives dependability for the longest time that proves most economical.

A valve to be good and satisfactory under all conditions must be strong enough, and made for maximum service, not merely the average—Jenkins Valves are such valves.

Know the genuine by the Jenkins "Diamond" and signature

JENKINS BROS.

New York Philadelphia Boston Montreal Chicago London

Jenkins Valves
SINCE 1864

LOCKPORT Felts

EXCLUSIVE MAKERS OF

Paper Makers' Felts

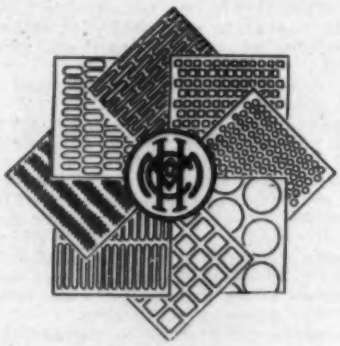
Have You Run Them?
If Not, Why Not?

Are You Interested in Accurate Running Felts?

Give Us a Trial
Get Authentic Information
Ask the Men Who Run Them

Yours for service

LOCKPORT FELT CO., Newfane, N. Y.



Perforated Metal Screens

in all metals for pulp and paper mills

Elevator Buckets (Plain and Perforated)

Conveyor Flights and Trough

General Sheet and Light Structural Work

Light and Heavy Steel Plate Construction

Write for perforated metal handbook

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Main Office & Works 51 Dundaff Street Carbondale, Penna.

30 Church Street New York City

544 Union Arcade Building Pittsburgh, Penna.

Books on Paper Manufacture

Subscriptions are being taken for the new Textbooks on the Manufacture of Pulp and Paper of the Joint Committee on Vocational Education of the Pulp and Paper Industry, a complete set of which should be owned by every firm or individual connected with the industry.

The set will be complete in five volumes. Volumes I and II deal with arithmetical operations, elementary mathematics, drawings, etc. Volumes III, IV and V, to be issued shortly, will deal with pulpwoods and their preparation; manufacture of pulp; analytical methods; and paper manufacture in all its aspects.

Volumes I and II are now on sale at $5.00 a volume. In the selection of classroom problems bearing on the principles and practice of pulp and paper manufacture they represent the highest standard in textbook publishing.

Orders, with remittances, will be filled by the Technical Association of the Pulp and Paper Industry, 18 East Forty-first Street, New York.

Wood Pulp

Several interesting and important developments have occurred in connection with foreign wood pulp. One of these is that, in all probability, chemical pulp will be placed on the dutiable list under the new permanent tariff bill now in the hands of the Senate Finance Committee and which is expected to be reported out from that committee during the next few days. Authoritative advices from Washington are to the effect that a duty of 5 per cent ad valorem to be operative on the American valuation plan is to be imposed on imported chemical pulp. When pressure was first brought to bear, presumably by domestic pulp manufacturers, to have wood pulp taken off the free list, it is stated that Congressional leaders having the tariff in hand placed a 10 per cent ad valorem duty on pulp, but since then so much opposition has arisen to the proposed import tax on pulp that it is understood the rate has been reduced to 5 per cent. Mechanical pulp is not to be taxed, according to reports, ground wood remaining on the free list.

As would be expected, there is much opposition to the proposed import duty on pulp. It is understood that domestic producers, in arguing for a duty on foreign pulp, cited the tremendous increase in imports in recent months and pointed to the shutdown of many pulp mills in the United States and the slow operations of others, contending that improvement in the domestic industry could not be effected until something was done to curtail shipments of pulp into this country by foreign manufacturers. Importers, individually and through their association, are doing what they can to defeat the proposed duty; newspaper publishers are lending their influence against a tariff on pulp, while domestic news print manufacturers are bringing pressure to bear to keep pulp on the free list, contending that it is not fair to them to tax their raw material while keeping print paper on the free list. Some of those opposed to the duty advance the argument that should the United States impose a duty on pulp, Canada may retaliate by prohibiting the export of pulp wood into this country, which, it is asserted, would place many domestic pulp manufacturers in a very unfavorable position since they procure the bulk of their wood supplies from Canada.

Another development of note is that, following almost immediately on the falling down of the charges that European producers were dumping wood pulp into the American market, complaints have been filed with the Customs authorities in Washington that pulp is being dumped from Canada. A quiet investigation has been conducted by the Government officials, in which the pulp trade has been highly interested, and it is understood on very good authority that no proof has been secured that the Canadians are actually dumping pulp into the United States. Instances have been cited where Canadian pulp has been sold in the U. S. at surprisingly low prices, but on investigation it invariably has been shown that the quality of the pulp involved was such that the pulp was not worth any more than was charged for it.

There is no question but that wood pulp is coming into the United States in record-breaking quantities. By way of example, Government figures for January show that no less than 95,637 net tons of chemical wood pulp were imported during that month, while in December importations reached a total of 117,069 tons of chemical pulp. When it is considered that before the war around 35,000 tons of pulp was looked upon as a month's normal importations from Europe, it can be readily surmised how heavy imports are at present. Going further into statistics, the above figures show that importations of chemical pulp in January were very nearly four times as large as in the same month of 1921, and that December imports were more than three times the tonnage imported in the same month a year ago.

The market for imported pulp is comparatively quiet. Business is transpiring, of course, but importers as a rule report paper manufacturers as buying slowly and cautiously, and demand is said to lack snap although it is generally admitted that there is a relatively better movement of foreign pulp at present than of domestic chemical pulp. Quotations show little or no change, with No. 1 bleached sulphite quoted at 4.25 to 4.50 cents a pound ex dock New York or other American Atlantic ports, No. 1 unbleached sulphite at around 2.75 cents a pound, easy bleaching sulphite at 3 cents upward, Mitscherlich unbleached sulphite at 2.90 to 3 cents, and kraft pulp at from 2.60 cents upward. There is little supply of ground wood now coming in from European sources, and nominal prices are from $35 a ton upward.

Receipts at the port of New York in March and current market quotations follow:

Bleached sulphite, No. 1	$ 4.25-$ 4.50
Unbleached sulphite, No. 1	2.65- 2.90
Easy bleaching	3.00- 3.25
Mitscherlich unbleached	2.90- 3.00
Kraft	2.60- 2.85
Ground wool, per ton	35.00-

Castle, Gottheil & Overton, 2,113 bls. from Rotterdam and 500 bls. from Hamburg; Equitable Trust Co., 1,436 bls. from Hamburg; Brown Bros. & Co., 1,444 bls. from Hamburg; National Bank of Commerce, 1,861 bls. from Hamburg; National City Bank, 1,000 bls. from Gothenburg; Guaranty Trust Co., 1,341 bls. from Gothenburg and 651 bls. from Hamburg; E. Butterworth & Co., 152 bls. from Christiania; Fred Enders & Co., 1,000 bls. from Hamburg; M. Gottesman & Co., 550 bls. from Rotterdam; Mechanics & Metals National Bank, 1,000 bls. from Gothenburg; Kelly & Co., 1,892 bls. from Gothenburg and 5.540 bls. of ground wood from Liverpool, N. S.; E. M. Sergeant & Co., 780 bls. from Christiania; A. J. Pagel & Co., 300 bls. from Christiania; First National Bank of Boston, 200 bls. from Christiania; J. Andersen & Co., 1,100 bls. from Christiania; Lagerloef Trading Co., 2,695 bls. from Hango; Tidewater Paper Mills Co., 30,515 bls. of ground wood from Liverpool, N. S.; Order, 2,521 bls. from Hamburg and 608 bls. from Gothenburg.

Paper Stock

Importations of papermaking materials at present are rather light. This is to be expected in view of the limited demand from American consumers, who are noticeably opposed to absorbing supplies other than those directly required and who therefore are placing orders guardedly. Importers in turn are cautious about contracting for supplies at European sources, and in numerous cases are not bringing stock into the country unless having it sold to mills. The prices prevailing on papermaking raw material also have an influence in checking the flow of supplies from foreign countries into the American market. Importers assert that in most instances the prices consumers here are willing to pay do not permit them to buy from merchants in Europe, let alone pay the cost of bringing the goods across the ocean and give them a profit in handling the merchandise.

Old rope imports have dropped off to a marked extent, and but occasional shipments of old bagging and miscellaneous paper stock have arrived recently. Rag importations were of moderate tonnage during the last month though nothing out of the ordinary. Arrivals through the port of New York during March follow:

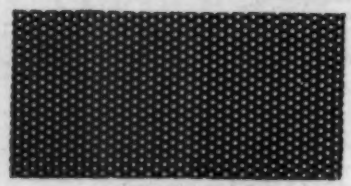
Old Rope

Brown Bros. & Co., 196 coils from Bristol and 187 coils from Hull; E. J. Keller Co., 64 coils and 169 bls. from Rotterdam; Old Colony Trust Co., 165 bls. from Genoa; J. Hughes, 98 coils from Glasgow; Bank of Montreal, 70 coils from Rotterdam; Daniel M. Hicks, Inc., 104 coils from Leith; W. Schall & Co., 57 coils from Hamburg and 88 bls. from Barcelona; First National Bank of Boston, 35 coils from Rotterdam; Ladenburg, Thalman & Co., 127 coils from Antwerp and 155 coils from Rotterdam; Atlantic National Bank, 157 coils from Antwerp; Phelps Bros. & Co., 69 coils from Trieste; Order, 29 bls. from Antwerp and 85 bls. from Genoa.

Old Bagging

Maurice O'Meara Co., 360 bls. from Rotterdam; R. F. Downing & Co., 165 bls. from London; E. J. Keller Co., 142 bls. from Hamburg; Castle, Gottheil & Overton, 66 bls. from Antwerp; E. Butterworth & Co., 70 bls. from Antwerp; J. J. Patricof & Co., 759 bls. from Antwerp.

Perforated Metal Screens for Pulp and Paper Mills



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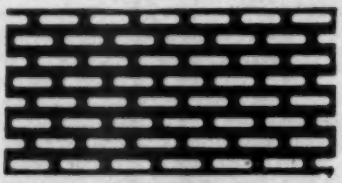
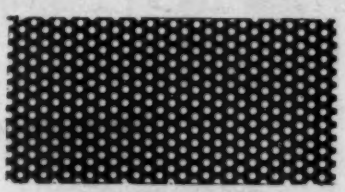


1/8 x 1/2" Slots



3/32 inch round

Steel, Copper, Brass, Bronze and other alloys punched for Centrifugal and Rotary Screens, Pulp Washers, Drainer Bottoms, Filter Plates, etc.

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RECORD

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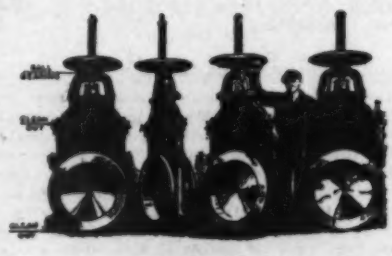
QUICK OPENING GATE VALVES

Lever, Screw or Rack Operated



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LIVERMORE FALLS, MAINE

KNOW WHAT YOUR COAL BILL SHOULD BE

There's no longer any such commodity as "Cheap Coal," and indications are that there probably never will be again. At present prices, or for that matter—at *any price*—it is neither good engineering practice nor good management to check your coal by mine weights or railroad weights.

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insure an *accurate* and *positive* check on every ounce of coal consumed. They provide a means, without additional labor cost, of checking the total received against the total purchased. They show to operator and executive the exact amount of coal consumed by each boiler. They bring efficiency and economy into coal consumption.

Weighs—records—indicates—without manual effort—the entire operation automatic.

Each machine is a unit in itself, so perfect in design and flexible in application that it will meet any existing plant conditions.

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PURIFICATION SYSTEMS
SOFTENING & FILTRATION
FOR BOILER FEED AND
ALL INDUSTRIAL USES

WM. B. SCAIFE & SONS CO., PITTSBURGH, PA.

Rags

E. J. Keller Co., 630 bls. from Copenhagen, 1,040 bls. from Brest, 662 bls. from Hamburg, 44 bls. from Rotterdam, 57 bls. from Antwerp and 88 bls. from Bremen; J. Perlman, 29 bls. from Havana; Arrowhead Mills, 42 bls. from Bremen; American Express Co., 131 bls. from Liverpool; Albion Trading Co., 210 bls. from Liverpool and 76 bls. from Bordeaux; Castle, Gottheil & Overton, 1,414 bls. from Rotterdam, 471 bls. from Hamburg, 297 bls. from Antwerp, 355 bls. from Havre and 89 bls. from Bordeaux; Brown Bros. & Co., 262 bls. from Rotterdam; Chemical National Bank, 1,125 bls. from Hamburg, 2 bls. from Rotterdam, 348 bls. from Bremen and 47 bls. from Havre; Maurice O'Meara Co., 111 bls. from Hamburg; State Bank of New York, 66 bls. from Hamburg; George W. Millar & Co., 266 bls. from Rotterdam; Mechanics & Metals National Bank, 311 bls. from London, 230 bls. from Hull, 76 bls. from Bremen and 835 bls. from Hamburg; Chase National Bank, 96 bls. from Hamburg; P. Berlowitz, 466 bls. from Bremen, 116 bls. from Havre and 222 bls. from Hamburg; J. J. Patricof & Co., 679 bls. from Rotterdam; Katzenstein & Keene, 260 bls. from Marseilles and 217 bls. from Havre; M. Moran, 38 bls. from Liverpool; Guaranty Trust Co., 15 bls. from Hull, 22 bls. from Bordeaux and 466 bls. from Bremen; United States Lines, 138 bls. from Bremen; F. P. Gaskell & Co., 399 bls. from Bremen; Irving National Bank, 12 bls. from Hamburg; International Acceptance Bank, 31 bls. from Hamburg; J. M. Jaffe, 188 bls. from Rotterdam; Daniel M. Hicks, Inc., 505 bls. from Havre; Parsons & Whittemore, 218 bls. from Havre; Ladenburg, Thalman & Co., 55 bls. from Havre and 7 bls. from Hamburg; American Woodpulp Corp., 549 bls. from Hamburg; Agent de la Cie, 18 bls. from Bordeaux; Goldman, Sachs & Co., 125 bls. from Antwerp; Cleveland Trust Co., 20 bls. from Antwerp; L. H. Abenheimer, 15 bls. from Hamburg; Bankers Trust Co., 1,250 bls. from Hamburg; Order, 1,432 bls. from Brest, 27 bls. from Liverpool, 238 bls. from Bremen, 364 bls. from London, 139 bls. from Rotterdam, 200 bls. from Hamburg and 21 bls. from Havre.

Miscellaneous Paper Stock

Guaranty Trust Co., 40 bls. from Dundee and 327 bls. from Antwerp; E. J. Keller Co., 42 bls. from Dundee and 122 bls. from Hamburg; Ladenburg, Thalman & Co., 10 bls. from Glasgow; Irving National Bank, 38 bls. from Glasgow, 42 bls. from Liverpool, 64 bls. from Hamburg and 230 bls. from Antwerp; Crane & Co., 21 bls. from Glasgow; E. Butterworth & Co., 60 bls. from Belfast and 54 bls. from Antwerp; Equitable Trust Co., 42 bls. from Antwerp; W. Hughes & Co., 345 bls. from Rotterdam; C. B. Richard & Co., 99 bls. from Havre; American Exchange National Bank, 36 bls. from Antwerp; Order, 50 bls. from Antwerp and 62 bls. from Dundee.

Paper

The outstanding feature of paper importations into the United States during the last month has been the large arrivals of wrapping paper, most of which has come from the Scandinavian countries though some fair-sized shipments have been received from Germany and Finland. Imports of news print, while still far above pre-war tonnage, have dropped off somewhat, but the smaller supplies of print paper seem to be easily made up by the marked increase in arrivals of wrapping. The bulk of the latter is said to be kraft paper of Swedish manufacture, and the marketing of it in the United States is unquestionably having influence on the domestic wrapping paper situation. Shipments running into the thousand of bales and rolls of kraft wrapping have been received during March by some of the large import houses, as will be seen from the data listed below.

News print imports in March were of fair tonnage, approximately 17,000 rolls arriving at the port of New York. Importations of cigarette paper were comparatively heavy, and there were numerous shipments of hanging, drawing, filter and writing papers, while some small lots of boards were imported. Arrivals at the port of New York during March follow:

Cigarette

British-American Tobacco Co., 139 cs. from Liverpool; American Tobacco Co., 325 cs. from Havre and 2,110 cs. from Bordeaux; R. J. Reynolds Tobacco Co., 2,609 cs. from Bordeaux and 3 cs. from Bremen; Rose & Frank Co., 20 cs. from Dunkirk and 74 cs. from Havre; Southern Pacific Co., 3 cs. from Havre; Surbrug Co., 60 cs. from Havre; L. Bobica, 9 cs. from Constantinople; Atlantic Forwarding Co., 2 cs. from Hamburg; P. J. Schweitzer, 100 cs. from Marseilles.

Printing

Haring Paper Corp., 391 rolls from Christiania; E. C. Melby, 266 rolls from Christiania; Chemical National Bank, 231 rolls

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ORVAR HYLIN, Vice President
MAURICE LONDON, Secretary

TRADE HL MARK
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SOLE AGENTS IN U. S. A., CANADA, MEXICO AND CUBA FOR

Finnish Cellulose Association
Helsingfors, Finland

AND

Finnish Wood Pulp Union
Helsingfors, Finland

"ROGERS-BUFFALO" Automatic Knife Grinder

Sharp, true, keen-cutting edges are the results of Knives sharpened on this machine.

This cut shows our Type "G" Grinder with Full Automatic Feed and Water Attachment

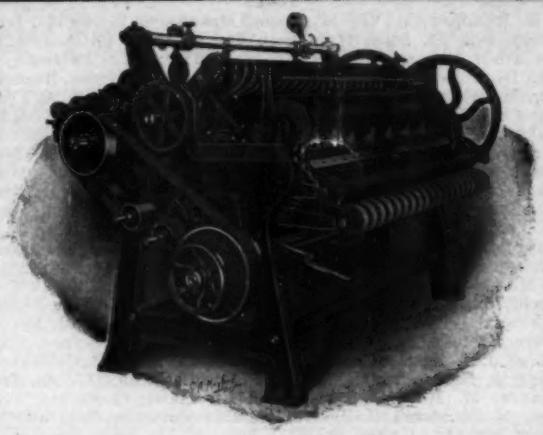
These essential features are clearly shown in this cut. Our Type "G" is "THE" Machine for the Paper Mill, as it will very readily grind Hog, Barker, Chipper and Paper Cutting Knives up to its capacity.

Type G in sizes from 26" to 72"
Type B in sizes from 54" to 130"

Guaranteed to eliminate your Knife troubles

Write for Our Catalogue

SAMUEL C. ROGERS & CO.
No. 22 Lock St., Buffalo, N. Y.
"World's Pioneer Knife Grinder Builders"



PAPER CUTTERS

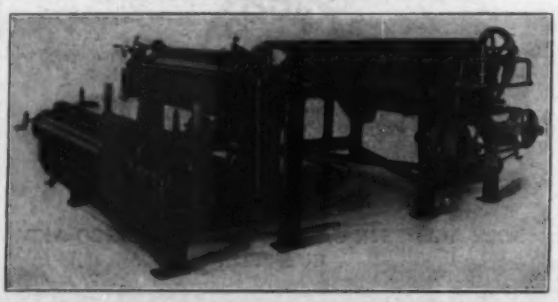
Single, Duplex, and Diagonal

CUTTER KNIVES
PATENT TOP SLITTERS

Hamblet Machine Co.
LAWRENCE, MASS.

Wax Paper Coating Machines

Carbon Paper Coating Machines
Gumming and Gluing Machines



Type 40-G. Semi and Full Wax Coating Machine.
Patented in United States. Also in Great Britain, Canada and Germany.

This machine will coat one or both sides of the paper with the exact amount of wax desired; with finest high gloss finish on self-sealing bread wrappers, also on both heavy or light papers; it can absorb the wax entirely into the paper or retain most on the outside; also high grade dry waxed paper, and best grades of waterproof and oiled papers up to 72 inches wide, at a fast rate of speed. For light tissue waxing, use our Type 45-C.

Write for particulars of machines in which you are interested. Submit your problems to our Engineering Dept. A.

MAYER COATING MACHINES CO.
Rochester, N. Y., U. S. A.
CABLE ADDRESS—CARMATIC

Stickle Compound Condensing System

and Automatic Steam Control

for Paper Machines

As shown in the folder we sent out to the mills—*"How to Dry Paper"*—showing our Compound Condensing System for draining the dryers and heating the air with the discharge from the dryers to condition the machine room should interest you. We guarantee a saving of 20 per cent in steam consumed for this purpose.

Open Coil Heater & Purifier Company
Indianapolis Indiana
Boston Philadelphia

from Bremen and 509 rolls from Hamburg; Globe Shipping Co., 1,045 rolls from Bremen and 17 cs. from Havre; F. G. Prager & Co., 578 rolls from Bremen; B. F. Drakenfeld & Co., 43 cs. from Liverpool; F. B. Vandegrift & Co., 106 cs. from Hamburg; L. A. Consmiller, 8 cs. from Rotterdam; Maurice O'Meara Co., 1,300 rolls from Gothenburg; C. K. MacAlpine, 1,835 rolls from Gothenburg; New York Tribune, 306 rolls from Christiania; Central Union Trust Co., 550 rolls from Christiana; Borregaard Co., 116 rolls from Gothenburg; A. Stuff, 125 rolls from Gothenburg; C. L. Robinson, 393 rolls from Hamburg; White Burbank Paper Co., 28 bls from Hamburg; F. L. Kraemer & Co., 4cs. from Hamburg; H. Lips, 50 cs. from Havre; National Park Bank, 2 cs. from Hamburg; J. & J. Scott, 63 rolls from Hamburg; Parsons & Whittemore, 381 rolls from Hango; F. A. Munsey & Co., 961 rolls from Hango; H. Reeve Angel & Co., 2 rolls from Hango; Order, 465 rolls from Copenhagen, 956 rolls from Christiania, 3,413 rolls from Bremen, 3,146 rolls from Hamburg, and 30 bls. from London.

Wrapping

Guaranty Trust Co., 772 bls. from Hamburg; Wilkinson Bros. & Co., 115 bls. from Hamburg, 710 rolls and 543 bls. from Bergen, 483 rolls from Gothenburg, 422 bls. and 174 rolls from Rotterdam; Republic Bag & Paper Co., 5,061 rolls from Hamburg and 1,109 rolls from Bremen; F. B. Vandagrift and 399 bls. from Gothenburg, and 988 rolls and 39 bls. from & Co., 327 rolls from Hamburg; D. S. Walton & Co., 5,559 rolls Christiania; Irving National Bank, 230 rolls from Gothenburg, 44 bls. from Antwerp and 223 rolls from Christiania; Birn & Wachenheim, 202 cs. from Rotterdam; J. P. Hefferman Paper Co., 288 bls. from Gothenburg; Maurice O'Meara Co., 732 bls. from Gothenburg; Arkell Safety Bag Co., 176 rolls from Gothenburg; Coy, Hunt & Co., 304 bls. and 316 rolls from Gothenburg; Diem & Wing Paper Co., 8 rolls from Gothenburg; M. M. Cohen, 317 rolls from Gothenburg; C. F. Hubbs & Co., 53 rolls from Gothenburg; A. Bleyer & Co., 209 bls. from Hango; National Bank of Commerce, 9 bls. from Christiania; International Acceptance Bank, 162 bls. and 75 rolls from Christiania; Ladenburg, Thalman & Co., 758 rolls and 213 bls. from Hamburg; H. Reeve Angel & Co., 4cs. from Antwerp; Order, 537 bls. from Hamburg.

Hanging

A. C. Dodman, Jr., 25 bls. from Liverpool and 43 bls. from Antwerp; A. Murphy & Co., 18 bls. from Liverpool, 14 bls. from Havre, 26 bls. from London and 53 bls. from Hamburg; R. F. Downing & Co., 24 bls. from London; W. H. S. Lloyd & Co., 105 bls. from London, 2 cs. from Liverpool and 45 bls. from Havre; F. E. Emmerich & Co., 94 bls. from Antwerp and 68 bls. from Bremen; C. T. Welch & Co., 2 cs. from Havre; F. G. Prager & Co., 5,185 rolls from Antwerp; M. J. Corbett & Co., 2 cs. from Rotterdam; Independent Forwarding Co., 6 cs. from Havre; Order, 38 cs. from Yokohama, 17 cs. from London and 1,636 rolls from Bremen.

Writing

J. W. Hampton, Jr. & Co., 6 cs. from Hamburg and 7 cs. from Havre; Chemical National Bank, 261 cs. from Bergen; T. Nevin, 4 cs. from London; Irving National Bank, 21 cs. from Antwerp; Stern Bros., 6 cs. from Havre; Order, 48 cs. from Hamburg.

Drawing

Lunham & Moore, 17 cs. from Rotterdam; G. W. McIver & Co., 17 cs. from Bremen; R. F. Lang, 1 cse. from Liverpool; Keuffel & Esser Co., 5 cs. from Rotterdam and 106 cs. from Hamburg; Kolasch & Co., 11 cs. from Rotterdam; E. Dietzgen & Co., 22 cs. from Hamburg; R. F. Downing & Co., 4 cs. from London; Order, 2 cs. from Liverpool.

Filter

Bernard, Judae & Co., 7 cs. from Gothenburg; Zinkeisen & Co., 3 cs. from Hamburg; Lunham & Moore, 6 cs. from Rotterdam; American Express Co., 7 cs. from Marseilles; G. Lueders & Co., 10 bls. from Barcelona; E. Fougera & Co., 46 cs. from Bordeaux; Order, 12 cs. from Hamburg.

Tissue

Meadows, Wye & Co., 18 cs. from Liverpool; C. H. Wyman & Co., 30 cs. from Liverpool; Wilkinson Bros. & Co., 10 bls. from Liverpool.

Boards

C. B. Richard & Co., 21 cs. from Bremen; F. G. Prager & Co., 52 cs. from Hamburg; Metropolitan Importing and Mfg. Co., 39 cs. from Hamburg and 22 cs. from Bremen; Bendix Paper Co., 83 cs. from Bremen and 18 cs. from Hamburg; M. J. Corbett & Co., 2 cs. from Bremen; Bernard, Judae & Co., 7 cs. from Hamburg; Happel & McAvoy, 2 cs. from Hamburg;

ELMENDORF
PAPER TESTER

Determines Tearing Strength

The tearing strength of paper for such uses as paper bags, sacks and wrappers is the best criterion of its suitability for these purposes

Write for Bulletin 17 on Paper Testing Instruments

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NORWOOD FILTERS

Clean Water
Low Maintenance Cost
Reliable

NORWOOD ENGINEERING CO.
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Our erecting facilities are such as to make it possible for us to replace or repair smoke stacks in any part of the United States.

LITTLEFORD Steel Smoke Stacks and Flues are ENGINEERED to suit the individual requirements of every purchaser. The design and methods employed in their erection are the results of over thirty years' experience.

Our engineering ability and experience is at your disposal for the asking.

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WOODEN TANKS

Are Good After 30 Years of Service

Many of our tanks built of Genuine Red Gulf Cypress are still on duty after giving more than thirty years of satisfactory service.

We carry no tanks in stock—all are accurately made to order for your special purpose.

Our Slogan—"Satisfied Customers Only"

Write today for information that should be in your possession. This is a part of our Co-operative Service.

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TANKS

Excellent Manufacturing Service on Large Tank Requirements

Blow Pits
Acid Storage Tanks
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We have a completely equipped department for making all kinds of tanks used in Paper Mill trade, having a machine for handling exceptionally large tanks. This machine will handle stock 12 inches thick; 30 inches wide; any length; dress all four sides; tongue, groove and bevel each piece at one operation, thereby insuring perfect joints and a uniform thickness of each piece in the finished tank.

Any Size or Shape Guaranteed Tight Cypress, White Pine, Long Leaf, Yellow Pine and Fir, Carried in Stock

Ask for catalog. Send us size required and specifications. We will make blueprints for same if desired.

Kalamazoo Tank and Silo Co.

KALAMAZOO, MICH.

Buschmann Bros., 6 rolls from Rotterdam; R. F. Lang, 12 cs. from Hamburg; Knauth, Nachod & Kuhne, 38 cs. from Bremen; Wiebusch Calendar Importing Co., 30 cs. from Hamburg; Irving National Bank, 327 rolls from Antwerp; F. S. Freed, 3 cs. from Hamburg; S. Feldman & Co., 12 cs. from Bremen; S. H. Pomerance & Co., 4 cs. from Hamburg.

Miscellaneous

H. W. Robinson & Co., 7 cs. from Hamburg; L. R. Wells, 2 cs. from Havre; International Forwarding Co., 2 cs. from Havre and 3 cs. from Hamburg; Travis & Parks, 2 cs. from Havre; Judson Freight Forwarding Co., 39 cs. from Havre; Pitt & Scott, 12 cs. from Havre; Davies, Turner & Co., 2 cs. from London; Baldwin Shipping Co., 14 cs. from Hamburg; Bernard, Risberg & Co., 19 cs. from Rotterdam; A. Frankan & Co., 2 cs. from Hamburg; Happel & McAvoy, 130 cs. from Hamburg and 20 cs. from Rotterdam; Defender Photo Supply Co., 100 cs. from Antwerp; P. C. Zuhlke, 271 cs. from Antwerp; Birn & Wachenheim, 39 cs. from Havre; Japan Paper Co., 6 cs. from Gothenburg, 1 cse. from London and 31 cs. from Genoa; W. F. Etherington & Co., 31 cs. from Glasgow; M. J. Corbett & Co., 3 cs. from Hamburg; G. D. Kuyper & Co., 2 cs. from Hamburg; F. A. Binder, 2 cs. from Hamburg; Koeller, Strauss & Co., 2 cs. from Hamburg; American Thermo Ware Co., 3 cs. from Hamburg; Hensel, Bruckmann & Lorbacher, 16 cs. from Hamburg; Wagner Bros., 2 cs. from Havre; F. Newman, 16 cs. from Bremen; C. A. Johnson & Co., 14 bls. from Liverpool; E. Daiber, 8 cs. from Antwerp; F. B. Vandegrift & Co., 3 cs. from Hamburg; Newark Paraffine & Parchment Paper Co., 8 rolls from Hamburg; Van Oppen & Co., 2 cs. from Hamburg; C. B. Richard & Co., 24 cs. from Hamburg; Philadelphia National Bank, 10 cs. from Hamburg; Favor, Ruhl & Co., 17 cs. from Havre; J. J. Gavin & Co., 3 cs. from Havre and 1 cse. from Liverpool; J. W. Lyon & Co., 5 lbs. from Havre; Coenca, Morrison & Co., 5 cs. from Havre; Perkins-Goodwin Co., 14 cs. from Genoa; C. F. Quattrosse, 4 cs. from Genoa; H. C. Danziger, 2 cs. from Hamburg; P. H. Petry & Co., 9 cs. from Hamburg; D. Andrews & Co., 5 bls. from Liverpool; Charles W. Williams & Co., 21 cs. from Antwerp; Sinclair & Valentine, 8 cs. from Hamburg; H. A. Caesar & Co., 2 cs. from Havre.

Foreign Trade Opportunities

A firm of wall paper dealers in Mexico desires to purchase various grades of wall paper and requests that sample books and prices be forwarded. The books to be returned without delay, if so requested. Quotations should be given f. o. b. factory or c. i. f. El Paso, Tex. Cash to be paid. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 1141.

The publisher of a newspaper in France desires to secure an agency for the sale of paper and printing machines. Quotations should be given c. i. f. French port. Correspondence should be in French. Reference. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 947.

An agency is desired by a mercantile firm in Mexico for the sale of caustic soda of 76 per cent strength. Quotations should be given c. i. f. Mexican port. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 1012.

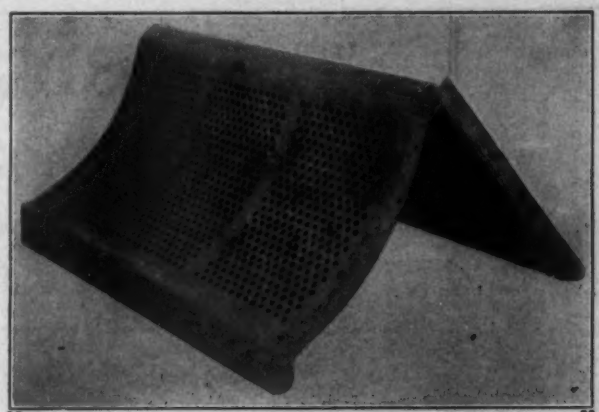
There is a market in Sweden for paper of various grades. Agencies are desired. Quotations should be given c. i. f. Swedish ports. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 957.

A traveling salesman in Denmark wishes to secure an agency of articles for sale to book and paper dealers. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 1020.

A manufacturing firm in Sweden wishes to secure an agency for the sale of high-grade paper. Quotations should be given c. i. f. Stockholm or Goteborg. References. For further data those interested should communicate with the Bureau of Foreign and Domestic Commerce, Washington, D. C., referring to Inquiry No. 1025.

"Dayton" Beating Engines are Built for Heavy Duty

Dayton Beater and Hoist Co.
DAYTON, OHIO



Because there are no moving parts this is a very simple but very efficient device. Patent No. 1,271,426 issued to Mr. Brownell Buehler, July 2nd, 1918.

The Shartle Continuous Beater Company
MIDDLETOWN, OHIO

E. D. JONES & SONS CO.

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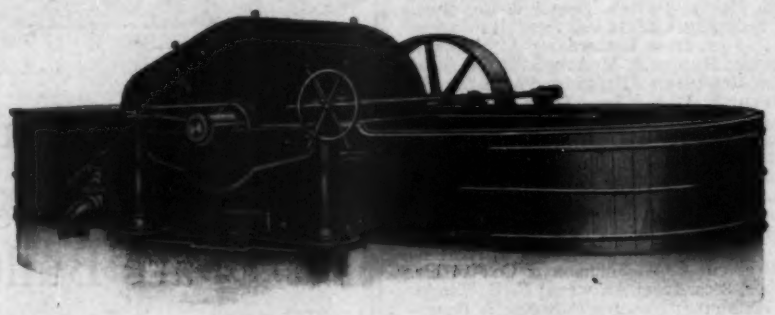

Beating Engine, Tub of Iron or Wood

Manufacturers of

Paper Making Machinery

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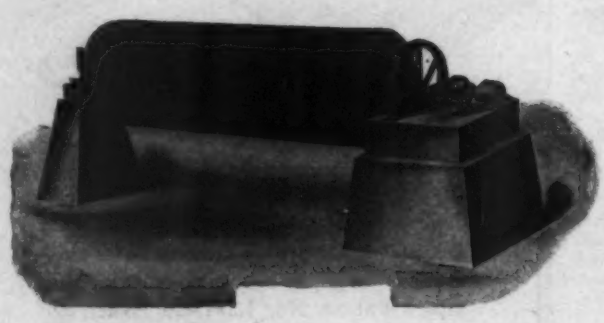
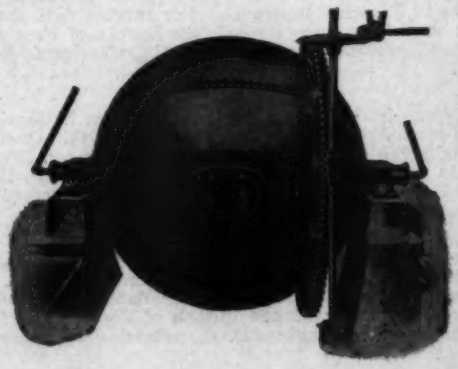
Globe and Cylinder Rotary Bleaching Boilers





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We specialize in Steel Storage and Pressure Tanks, and general steel plate construction for the paper trade.

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